Shoreline Conservation Easement Valuation Study

An Exploratory Framework for Assessing the Value Impact of Shoreline Conservation Easements on a Neighborhood Scale

San Juan County, Washington

Prepared for:
Friends of the San Juans &
The San Juan Preservation Trust

Prepared by:
Terra Valuations, LLC
June, 2015

SHORELINE CONSERVATION EASEMENT VALUATION STUDY

AN EXPLORATORY FRAMEWORK FOR ASSESSING THE VALUE IMPACT OF
SHORELINE CONSERVATION EASEMENTS
ON A NEIGHBORHOOD SCALE

INTRODUCTION

This study was commissioned by Friends of the San Juans (FSJ) and the San Juan Preservation Trust (SJPT) as part of their pilot Neighborhood Salmon Conservation Easement Program. The goal of the program is to achieve long-term protection of priority shoreline habitat and habitat forming processes within targeted salmon recovery regions of San Juan County by voluntary acquisitions of shoreline conservation easements. Valuation of the easements is identified as an essential part of the research and development of the program. The purpose of this study is to explore methods for assessing the value impact of shoreline conservation easements on a neighborhood scale as a preliminary exercise to conducting individual property appraisals.

While the ultimate goal for the program is to develop a process which the FSJ and SJPT can employ to obtain reasonably consistent and reliable estimates of easement values for purposes of preliminary negotiations with land owners and grant applications, the efficacy of any such process ultimately depends on the relative homogeneity of the properties and easement impacts, as well as any number of site-specific conditions. The analytical framework presented here is not intended to replace or attempt to provide a more accurate estimate of easement value than a traditional market value appraisal of a property performed under the "before and after" construct. Value discrepancies between any formulaic valuation process and an independently conducted appraisal may be particularly evident for properties with unusual or atypical features, where the shoreline conservation easement restrictions impose direct or indirect burdens on the remainder property, and/or where the standards for the appraisal require consideration of adjoining lands.

Scope of Research

The study focused on the following primary avenues of exploratory research and analysis:

1. Examine waterfront property sales to determine attributes which have the most influence on price/value
2. Develop multiple regression model to estimate waterfront land value
    a. total price as the dependent variable
    b. price per waterfront foot as the dependent variable
    c. adjustment for value change since 2010
3. Examine prediction errors and compare to assessed values
4. Estimate proportionate value of marine frontage to whole property (land only) based on marine view/marine front matched pairs
    a. examine variance for bank type
    b. examine variance for frontage to upland ratio
5. Analyze appraisals of conservation easements on waterfront properties
    a. examine price/value per extinguished density unit
    b. examine price/value per acre under easement
    c. examine patterns in encumbered value and diminution ratios
    d. examine relationship between conservation easement restrictions and conservation easement values (diminution factors)

6. Apply valuation model components to sample properties
    a. predicted value of waterfront parcel (multiple regression)
    b. adjust for current market conditions
    c. determine area and/or proportion of property impacted by easement
    d. apply range in diminution factors relative to bank type and degree of restrictions

This document summarizes the findings from these various research and analytical components, along with commentary regarding the veracity of the valuation framework to ultimately be used for its intended purpose.

Project Participants & Timeframe

The research project was designed and managed, and this summary report was written by Victoria Adams, of Terra Valuations, LLC. Victoria Adams is a Certified General Real Estate Appraiser, with expertise in valuing rural lands targeted for environmental protection and conservation easements.

Leif Warren, of Terra Valuations, provided assistance with the market research, database compilation, and GIS support.

The hedonic models were developed by Andy Krauss, PhD, under sub-contract to Terra Valuations, LLC. Mr. Krauss is a former Data Scientist for Zillow and is currently a Lecturer of Property at the University of Melbourne.

The study was conducted in several phases between March, 2014 and June, 2015.

Compliance with Applicable Standards

The scope of the assignment does not include the conduct of an appraisal of, or the formulation of an opinion of value for, any one or any group of properties tangentially referenced herein. The results, findings, opinions and/or conclusions presented have been developed in performance of a valuation service other than an appraisal or appraisal review. Nonetheless, the assignment involves services performed by an individual acting as an appraiser, and fits within the realm of Appraisal Practice, with obligation for compliance with the relevant precepts of the *Uniform Standards of Professional Appraisal Practice* (USPAP). Specifically all work conducted in association with this assignment has been made in compliance with the *Definitions*, the *Preamble* and the *Ethics, Competency, Jurisdictional Exception Rules* of USPAP. There are no applicable reporting standards or guidelines for assignments not involving an appraisal or appraisal review.

I. SAN JUAN COUNTY WATERFRONT SALES PROFILE

The study is conducted on sales of vacant and moderately improved marine frontage properties throughout San Juan County, transacting over the last eleven years. The sale data base was compiled from information obtained from Real Market Data (private market data service), the Northwest Multiple Listing Service, and the San Juan County Assessor. Filter criteria for selection included:

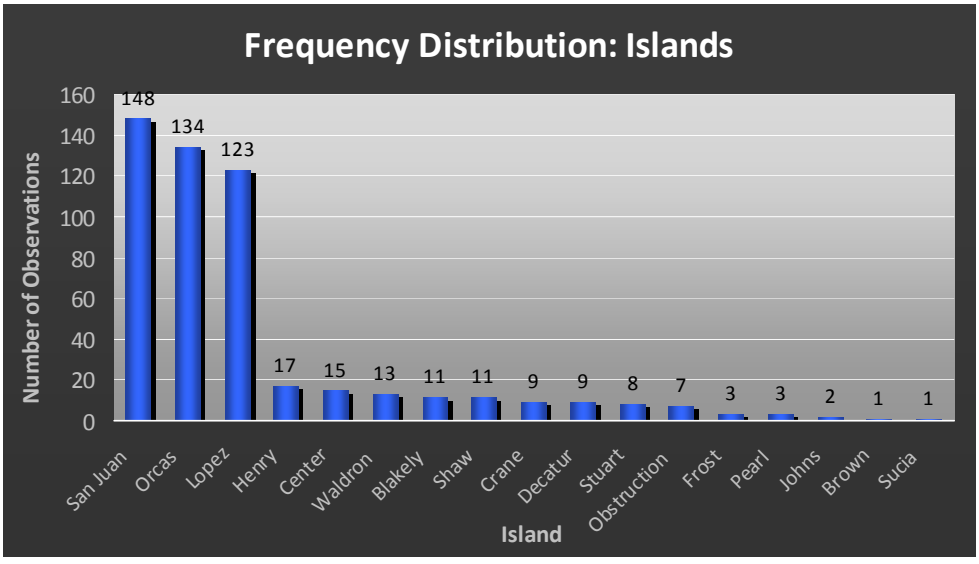
- Marine frontage (exclusive or shared private ownership)
- Sale date between January 1, 2004 and December 30, 2013
- Vacant parcels
- Improvements having an assessed value of $250,000 or less. This threshold was established to avoid using sales in which the contributory value of the improvements exceed the value of the land.
- Sale price of $50,000 or higher. This threshold was established to avoid using sales of non-economic remnants, unbuildable parcels, or low price anomalies.

Sales recorded with Quit Claim deeds, involving partial interests, transacting between related parties or other apparent indications of non-market circumstances were excluded. Properties consisting of tidelands with no appurtenant uplands were also excluded.

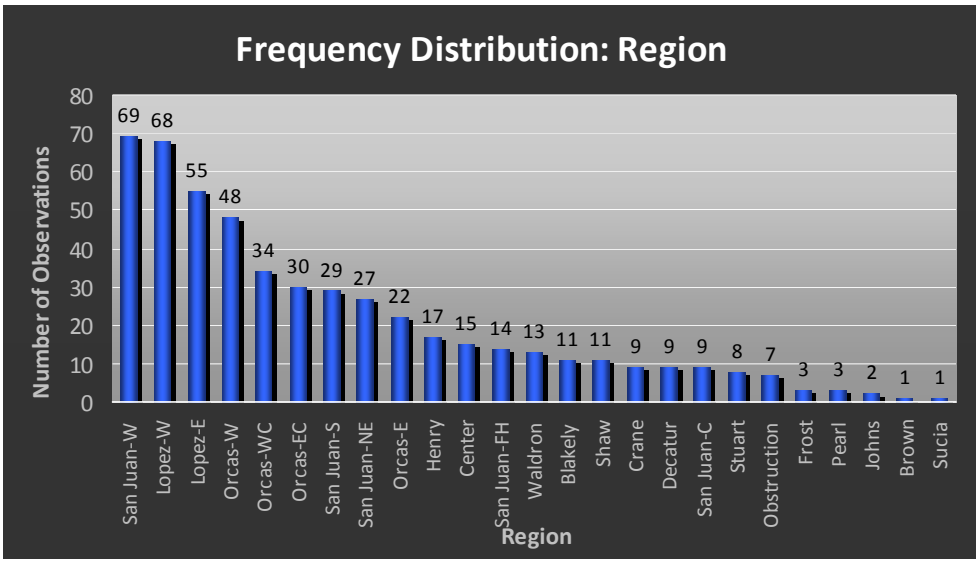
The resulting data base consists of 514 sales of waterfront property located on 17 different islands. The properties are identified by reference number in a set of maps presented in a separate Addenda.

Frequency Distributions: Location, Property Size & Year of Sale

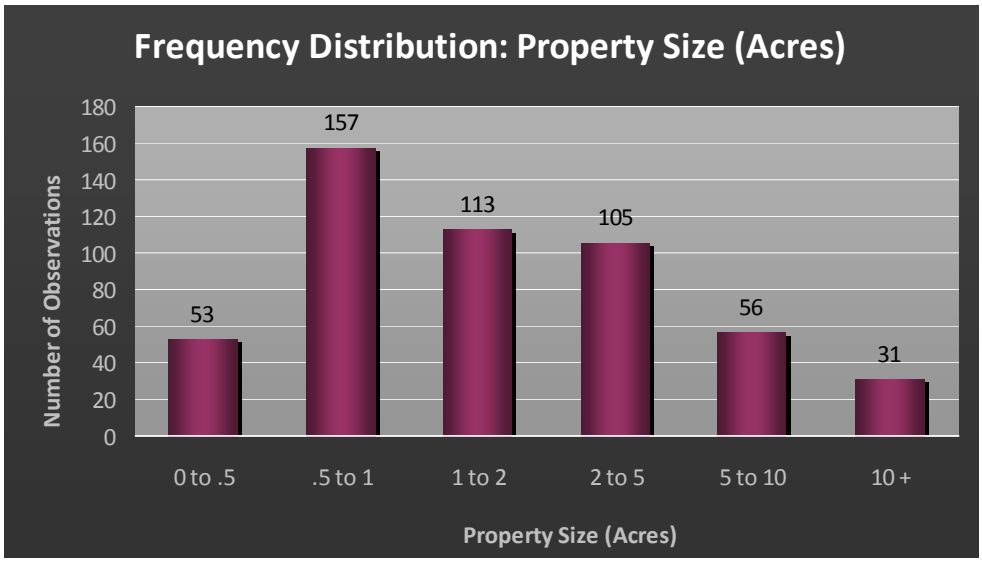
The frequency distributions by island, region, size (acres), bank type and year of sale are shown in the following graphs.



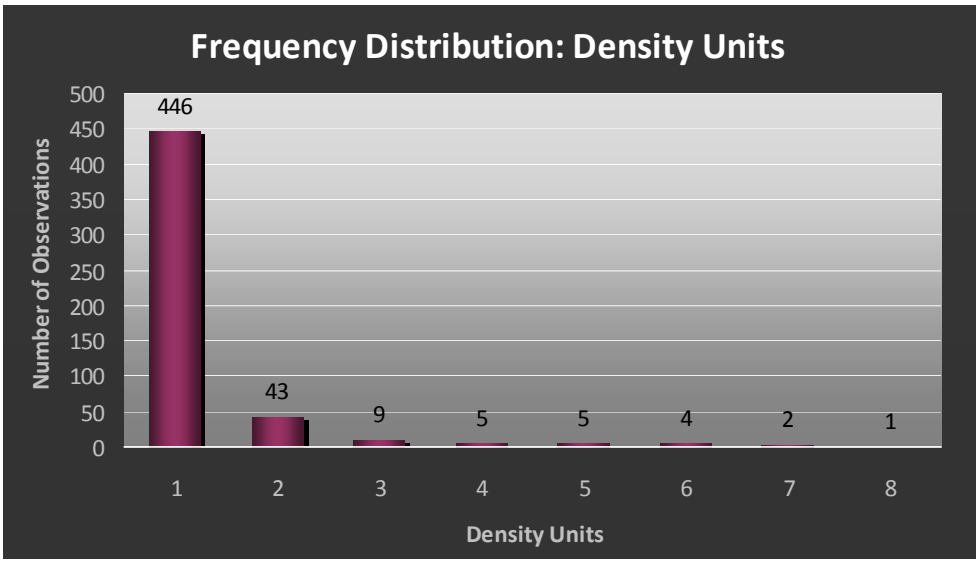
The largest number of sales occurs on San Juan Island (29% of total). Nearly 81% of the sales are on one of the four ferry served islands in the archipelago.



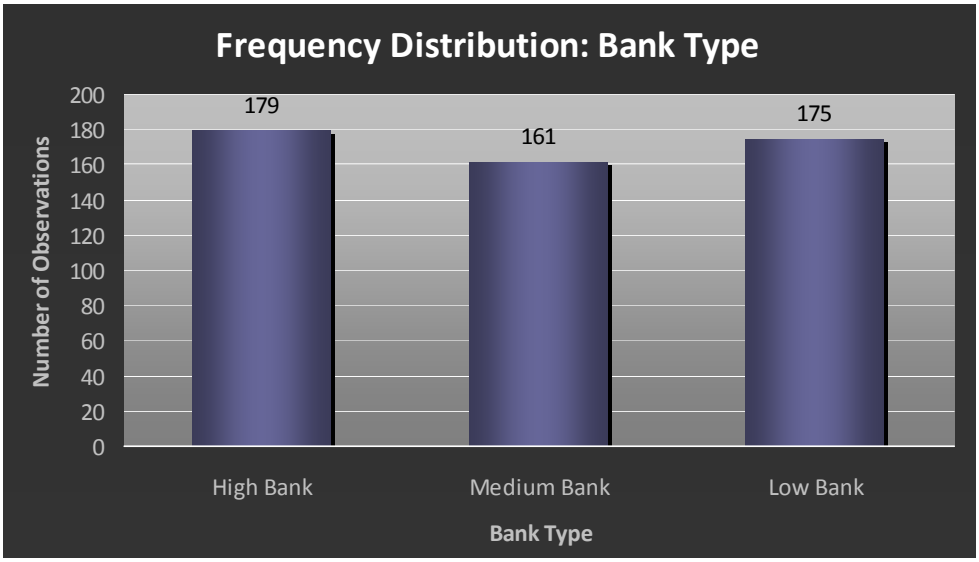
Among the ferry served islands, properties with western exposure are more frequent than those oriented to the east, north and south. 54% of the sales are situated on the west side of their respective islands.



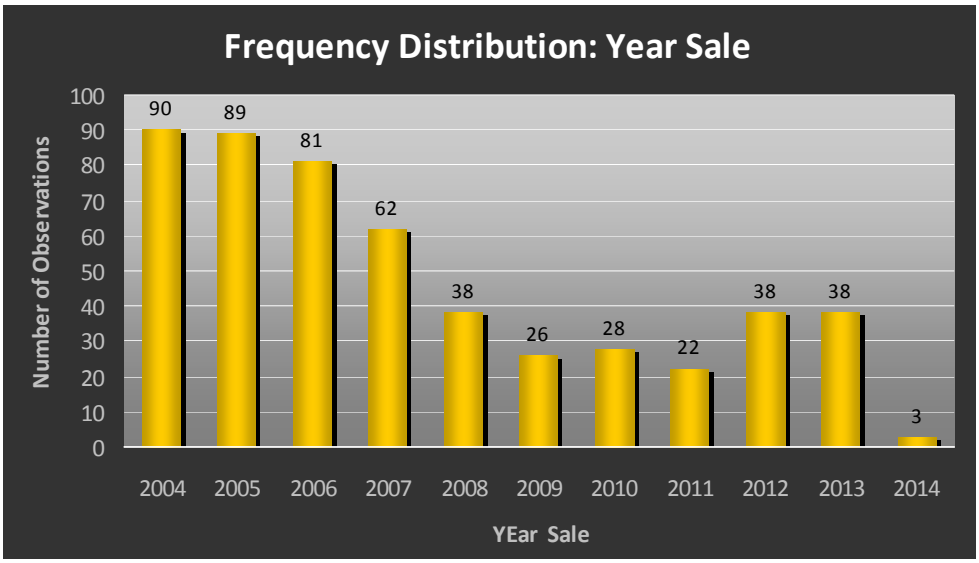
Most of the sales (41%) are one acre or less. Only 17% of the properties are larger than five acres.



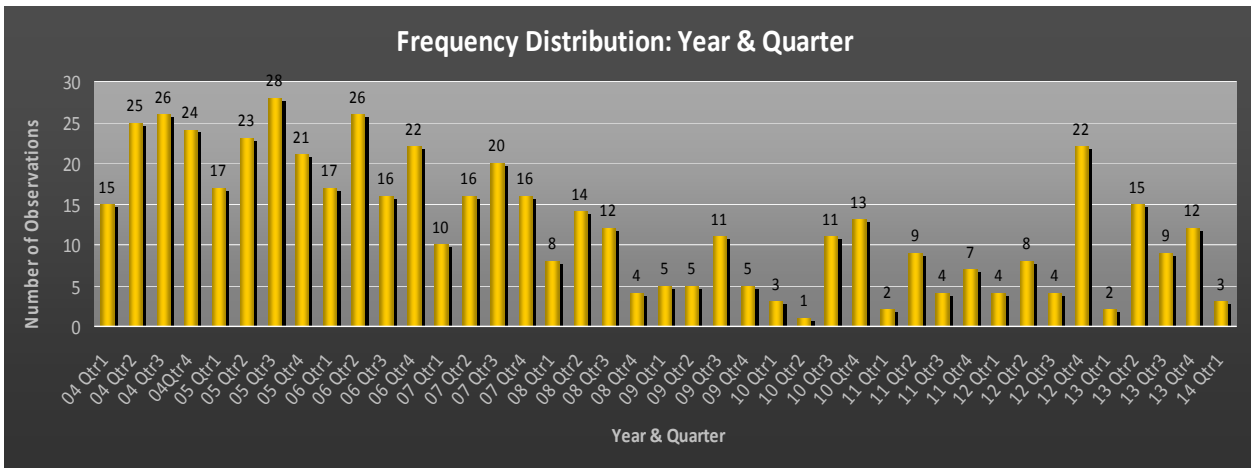
The vast majority (87% of total) of the waterfront sales are single tax parcels which cannot be subdivided. Another 43 (8%) include a second tax parcel which may or may not have the utility for a second building site. Only 5% of the properties are sub-dividable tracts.



The sales are fairly evenly distributed across bank types, with slightly more occurrences of high bank frontage (35% of total), and the fewest occurrences of medium bank frontage (32% of total). Bank type was evaluated based on information provided by the data source and visual examination of contour maps and Google Earth imagery.



Not surprisingly, there were more sales during the early years of the timeframe than in recent years. In respect to three periods of differing market conditions, 35% of the sales occurred in the pre-peak years of 2004 and 2005, 40% of the sales occurred during the peak of the market in 2006-2009, and 25% transacted during the declining market. [Note: 2014 sales include only the month of January so are not indicative of annual absorption.]



Though fewer sales occur in the first quarter of the year, sale activity is relatively evenly distributed throughout the rest of the year.

The number and percentage of total sales by quarter (all years combined) is as follows:

Qtr/ Season	No of Sales	% of Sales
1 Qtr /Winter	86	17%
2 Qtr / Spring	142	28%
3 Qtr / Summer	141	27%
4 Qtr / Fall	146	28%
	515	100%

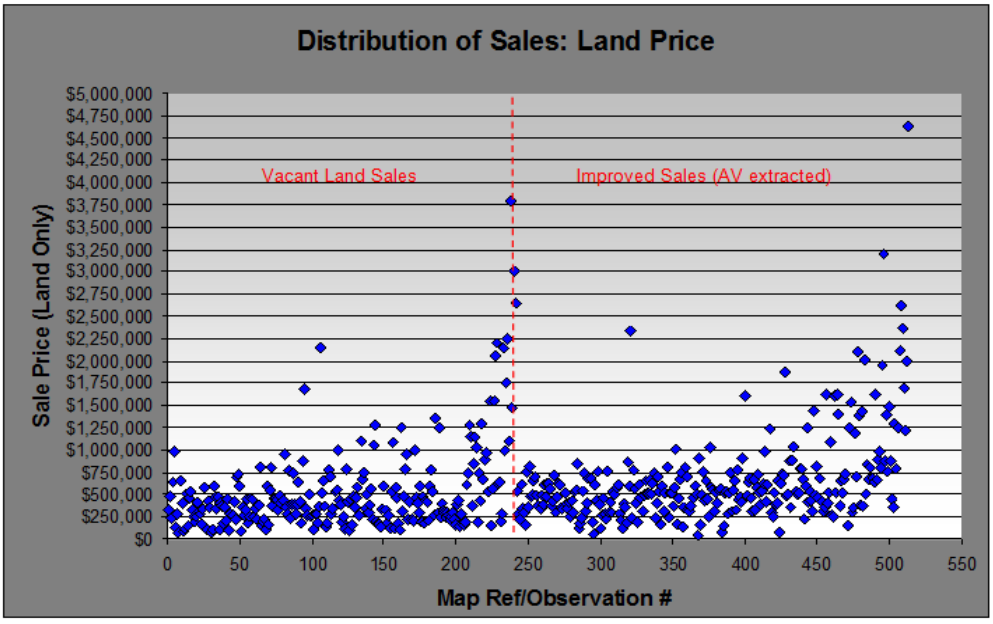
Frequency Distributions: Sale Price

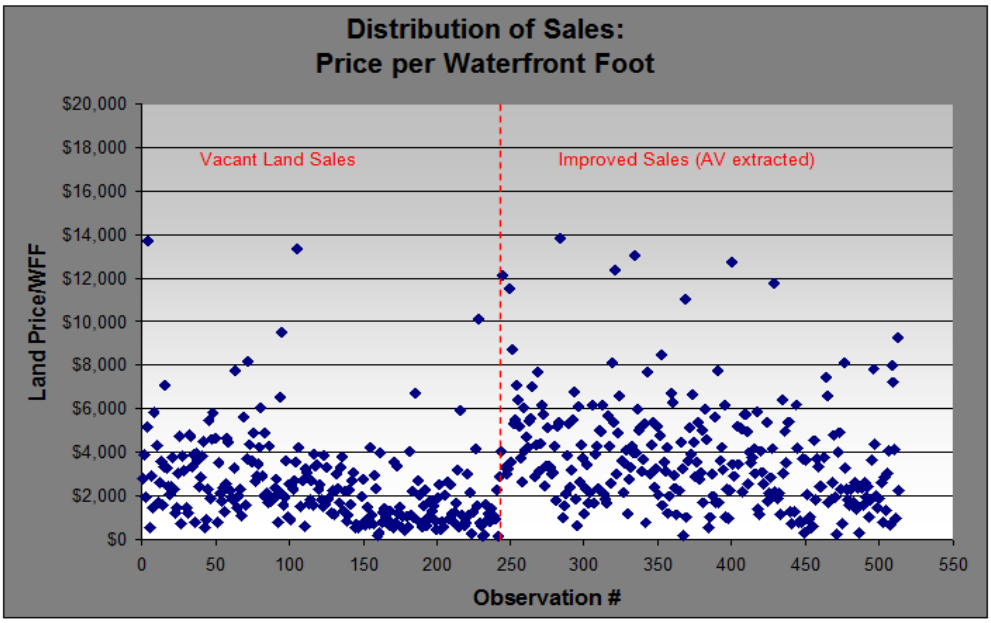
The assessed value of improvements is extracted from the sale price to yield an analysis price attributable to land only. The summary statistics for vacant parcels, improved parcels with contributory value of improvements extracted, and the combined database are presented in the table below and the distributions by total land price and land price per waterfront foot (WFFT) are shown in the accompanying scatter plots.

Even after extracting the value of the improvements, the improved parcels generally have a higher land price than vacant lots. Reasons for this disparity include some combination of lower than accurate assessments (relative to buyer/seller perspectives and/or the lag in the date of assessment relative to the year of sale), value of the entitlement and building permit process and site improvements which may not be reflected in the assessment of the structures, and the inherent value of a grandfathered building envelope where it is situated within the shoreline zone. On average, these factors add a 25% premium over vacant parcels.

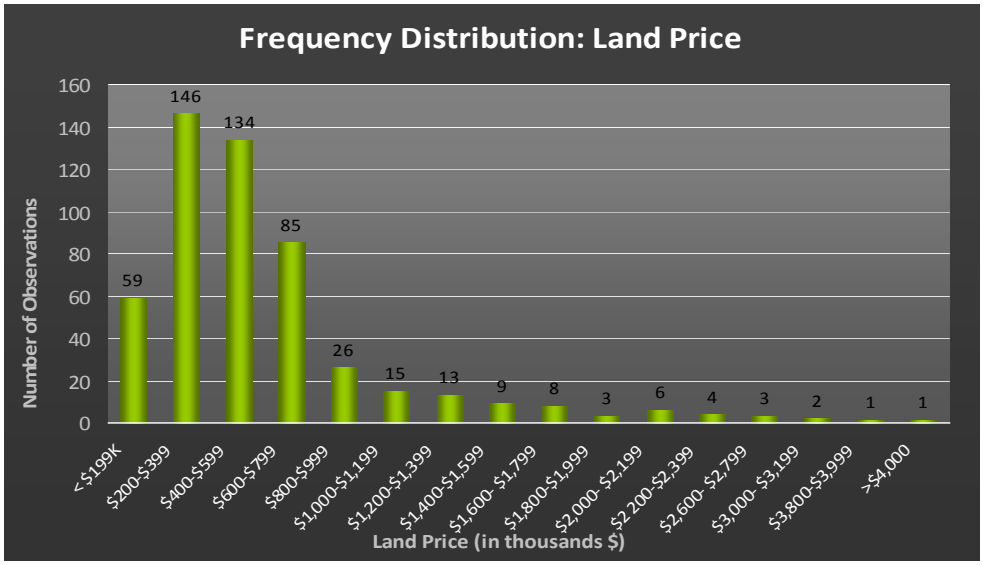
Summary Statistics: Sale Price (Land Only) & Price/WFFT

	Vacant		Improved		Combined	
	Price	Price/WFFT	Price	Price/WFFT	Price	Price/WFFT
count	242	242	272	272	514	514
minimum	$75,000	$163	$63,530	$276	$63,530	$163
maximum	$3,800,000	$13,681	$4,626,990	$18,533	$4,626,990	$18,533
median	$388,500	$2,024	$521,535	$3,364	$468,220	$2,642
mean	$529,838	$2,446	$662,343	$3,891	$599,957	$3,211
st dev	$499,899	$1,946	$527,629	$2,689	$518,505	$2,474





The sale price is analyzed by price category ($200,000 increments), island location, bank type and exposure in the following set of charts.



The majority of the sales (64% of total) have land prices ranging from $200,000 to $600,000. There are 65 sales with land prices of $1,000,000 or more, representing 13% of the database.

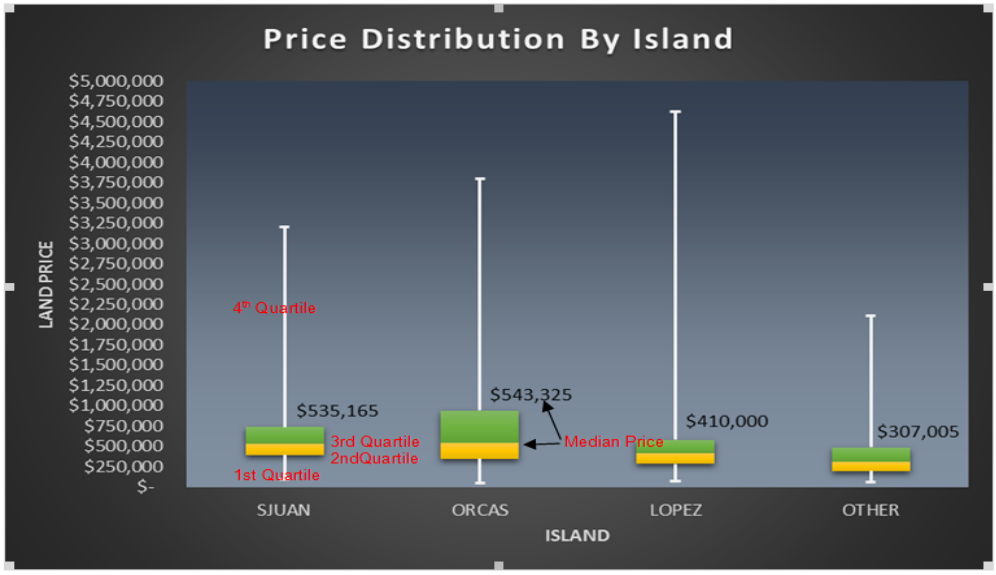
There is some price differential among the three largest ferry served islands of Orcas, San Juan and Lopez, and all other islands combined, though there is considerable dispersion around the measures of central tendency. In the graphic below, the key descriptive statistics for the three main islands and all other islands combined are represented in "box and whisker" plots to enable a comparison of the price distribution. The plots illustrate the range, middle spread and the central tendency of the price distribution. The two ends of the white vertical lines represent the minimum and maximum price points, and the space between

them and the rectangular boxes represents the price range of the first (below the boxes) and fourth (above the boxes) quartiles, respectively, The yellow and green boxes represent the price range of the second and third quartiles, within which a combined 50% of the observations fall, with the median price point situated somewhere in the middle.

Using San Juan Island as illustration, the following statistics are represented in the chart:

Minimum price:	$100,000
1st Quartile:	$396,750 (25% of the observations are within the range of $100,000-$396,750)
Median Price:	$535,165
3rd Quartile:	$737,915 (25% of the observations are between the median and $737,915)
Maximum Price:	$3,198,767

A straight comparison of the median values indicates Orcas Island to have the highest prices for waterfront property, followed closely by San Juan Island, and more distantly by Lopez, with the combined other islands having a significantly lower median price (approximately 25% lower than Lopez and 43% lower than Orcas) and maximum price (represented by the upper quartile) and less price dispersion than any of the three main islands.[1]



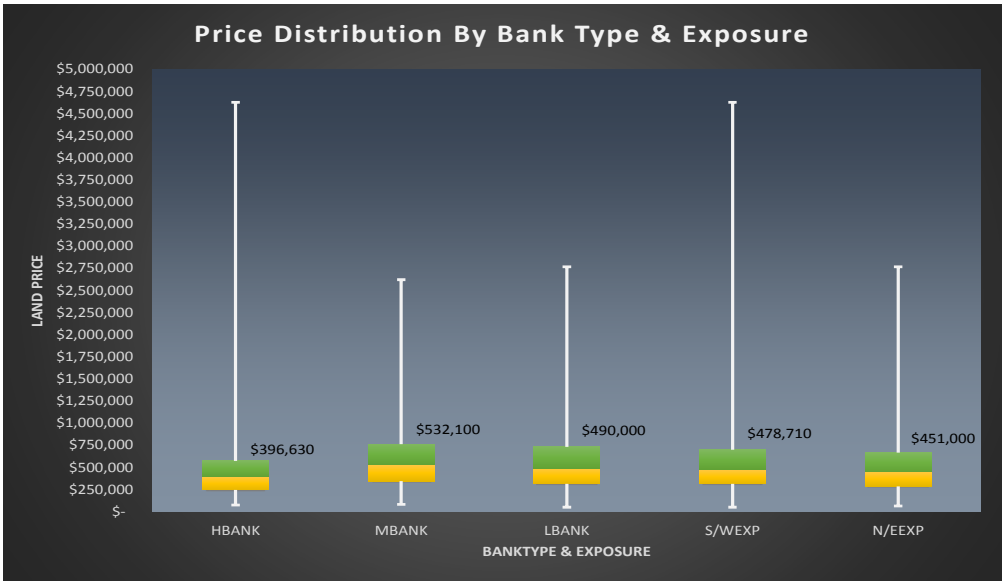
The Quartiles show the range in which 25% of the observations in each group fall. There is considerable dispersion in the fourth quartile, which is also reflected in the other price distribution charts. These are not standard normal distributions.

Most of the $1,000,000+ properties are located on Orcas and San Juan Islands. Though Lopez has only five sales in this price range, it has the highest priced sale within the dataset. Several of the other highest priced sales are for private islands. It is not surprising to find that most of the upper end sales occurred during the peak of the market in 2006 and 2007.

[1] These charts and median statistics exclude sales of private islands.

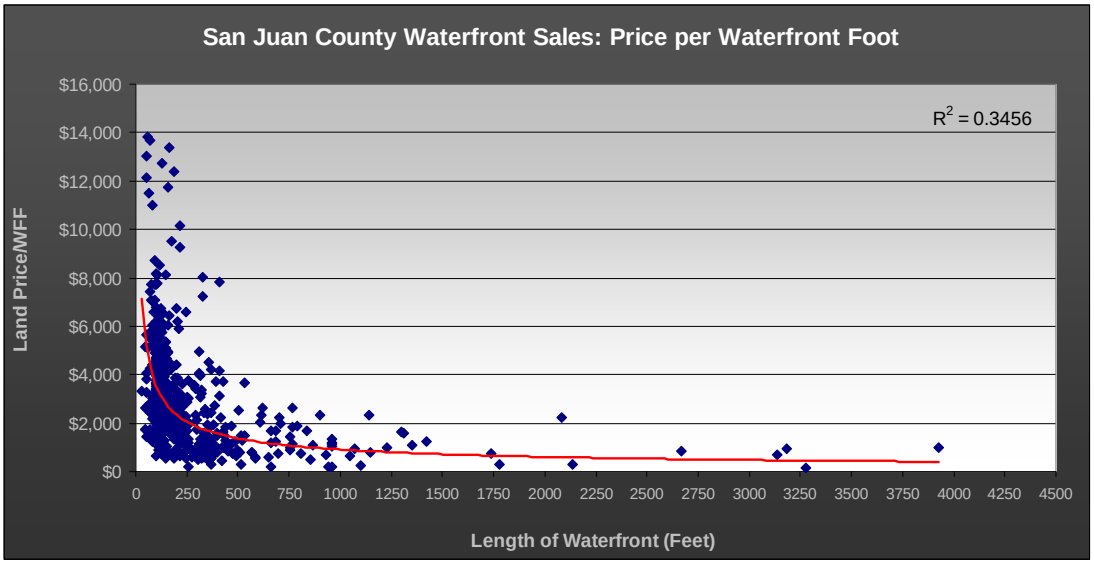
$1,000,000 + Sales Summary

Island	Count	%	Year of Sale	Count	%
San Juan	20	29%	2004-2005	14	21%
Orcas	32	47%	2006-2007	34	50%
Lopez	5	7%	2008-2009	11	16%
Other	8	12%	2010-2011	4	6%
Private Islands	3	4%	2012-2013	5	7%
Total	68	100%		68	100%



The highest median price is for properties with medium bank frontage ($532,100), though high bank properties reflect the greatest variance in price, and the highest price point. Properties with southern and/or western exposure are more valuable than those with northern and/or eastern oriented views.

There is a negative correlation between the length of marine frontage and the price paid per waterfront foot. This reflects the concept of diminishing marginal returns in which the unit price of a property generally declines as the size of the property increases. In this case, the relationship is nonlinear:



The R-square statistic (upper right corner) measures the strength of the relationship between the dependent variable (price per front foot) and the independent variable (waterfront length). In this instance, 34.6% of the variation in unit price can be explained by a property's waterfront length, alone.

II. DEVELOPMENT OF MULTIPLE REGRESSION MODELS

Multiple Regression models were developed from the San Juan County waterfront sales database for the purposes of identifying which attributes of a waterfront property are most relevant in explaining price differences and for predicting price/value. Hedonic models were developed using total price (inclusive of improvements) and price per waterfront foot as dependent variables. For every observation in the sale database, information was gathered for over 50 different property-related attributes, representing independent variables. Many of these variables are expressed as indicator (dummy) variables for modeling purposes.[2] A complete list of the variables, variable type, description and source is included in the Addenda.

Significant Independent Variables

The independent variables found to be significant in one or both of the price models include:

Significant Attributes
(Independent Variables)

- Location (island)
- Parcel acres
- Length of waterfront (feet)
- Waterfront ratio (feet per acre)
- Number of legal parcels/density units
- Wetlands (percent of total property)
- Shoreline split by road
- Bank type (high, medium, low)
- Percent of property with 60% slope
- Presence of dock (private or shared)
- Residential improvements
- Year of sale

One of primary sources of error in hedonic modeling comes from omitted variable bias. When modeling house prices, for example, excluding a variable describing the condition or age of the house can cause larger than expected errors in the results, since these factors influence sale price. The advantage in modeling house prices, especially in typical suburban or urban locations, is that the use and functionality of the property is known and most variables are readily measurable. In contrast, the number of unknown, uncollected and/or un-measureable variables pertaining to rural lands is often much greater. For this reason we

[2] An indicator or dummy variable (also referred to as a binary or qualitative variable) has a value of either 0 or 1 representing the absence or presence of the feature or category. For example, shoreline frontage is designated as one of three categories: high, medium or low bank. A low bank property is assigned a value of 1 in the low bank category (variable) and 0 in the other two. Sale date is treated similarly, as an annual time series.

cannot usually expect the same level of precision from a rural land model as from a model describing house prices.

Indeed, in the analyses performed here there is some inherent imprecision and/or inconsistency in the measurement of certain variables (for instance, the categorization of shoreline as high or medium bank may differ between the county assessor, the data source and the evaluator's visual assessment from a topographic map or aerial imagery), and there are certainly other omitted or non-numerically measurable variables which may have an influence on pricing. In other words, there are more factors that impact the sale price than are accounted for – or are most effectively measured – in the dataset. In large part, the problem is a function of the transactional data itself, which reflects the vagaries of market behavior.

Given the underlying purpose of the study to explore methods for valuing shoreline conservation easements which are intended to restrict certain shoreline activities and modifications, the absence of several target variables from the models is notable. Among the features identified and measured for each property are several categories related to shoreline modifications, to include: docks, shoreline armoring, boat ramps, buoys and a catchall "other" field.[3] With the exception of the presence of a dock, none of these variables were found to be statistically significant as explanatory variables, or useful in improving the model results. Though there are too few occurrences of boat ramps and the collective "other" category to have a statistical impact, approximately 12% of the properties were identified as having some kind of armoring structure. As measured here, these features simply do not appear to have a material influence, either positive or negative, on the price paid for a waterfront property.

Not Significant Attributes

(Independent Variables)

- Smaller geographic areas (neighborhoods, census block groups, specific non-ferry served islands)
- Marine view (likely measurement error)
- Lesser slopes & geo-hazards
- Tideland ownership
- Zoning
- View Orientation (S/W vs N/E)
- Shoreline modifications:
  - Boat ramps
  - Armor
  - Other modifications/structures

[3] Information on these shoreline features was obtained from the Shoreline Modification Inventory for San Juan County, prepared by Friends of the San Juans, July 2010.

Specifications of Total Price and Price per WFFT Models

Both linear and non-linear forms of the models were tested, with the latter performing better. A linear model assumes price increasing or decreasing at a monotonic rate, while a non-linear model allows the rate of change over the range of the variable to vary. Given that land values generally (though not always) experience marginal diminishing returns (i.e., the unit price per for the 1000th additional foot of marine frontage is less than the unit price of the 100th additional foot), the non-linear model is usually preferred. The summary statistics, variable coefficients and other parameters of the Price model (total price=dependent variable) and Waterfront Foot model (price per waterfront foot= dependent variable) are presented in the accompanying tables.

MULTIPLE REGRESSION SUMMARY
PRICE MODEL

R-square	0.7220	**sigma**	**F-Stat**	median pred error	23.11%
Adj R-Square	0.7075	0.3525	49.77 (24 & 460 df)	mean pred error	27.33%

Variable	Estimate	% Adjustment	Std. Error	t value	Pr(>|t|)
(Intercept)	10.87194143	10.8719	0.189610932	57.33815733	1.17E-211
log(acres)	0.067806811	7.02%	0.025891918	2.618840786	0.00911417
log(wfft)	0.301710377	35.22%	0.033523264	9.000029906	5.97E-18
sjuan	0.664132664	94.28%	0.050450123	13.16414365	8.21E-34
orcas	0.619074252	85.72%	0.050988646	12.14141385	1.28E-29
lopez	0.431663025	53.98%	0.051135626	8.441531973	4.12E-16
shaw	0.434094384	54.36%	0.1195512	3.631033276	0.00031401
pisland	1.109203574	203.19%	0.264585567	4.192230088	3.31E-05
dus	0.147481697	15.89%	0.025472982	5.78973028	1.31E-08
I(wetland_pct * 100)	-0.004290755	-0.43%	0.001972015	-2.175822486	0.03007683
splitwf	-0.220105912	-19.76%	0.067966243	-3.238459309	0.00128872
hbank	-0.14399508	-13.41%	0.044149365	-3.261543615	0.00119044
slp_gt60_pct	-0.646144087	-47.59%	0.196179256	-3.293641229	0.00106529
dock	0.269187903	30.89%	0.053371996	5.043616907	6.59E-07
I(av_improv/10000)	0.030311466	3.08%	0.002159315	14.03753952	1.64E-37
I(year == 2004)TRUE	-0.157149346	-14.54%	0.083636989	-1.878945511	0.06088399
I(year == 2005)TRUE	-0.009275192	-0.92%	0.084369278	-0.109935653	0.91250835
I(year == 2006)TRUE	0.147938419	15.94%	0.085023602	1.739968843	0.08253329
I(year == 2007)TRUE	0.328781961	38.93%	0.088087096	3.732464503	0.00021336
I(year == 2008)TRUE	0.135883558	14.55%	0.094548289	1.437186848	0.15134474
I(year == 2009)TRUE	0.042370624	4.33%	0.102637108	0.412819737	0.67993104
I(year == 2011)TRUE	-0.176035665	-16.14%	0.108366314	-1.624450052	0.10496476
I(year == 2012)TRUE	-0.26571757	-23.33%	0.094702334	-2.805818609	0.00523174
I(year == 2013)TRUE	-0.432471132	-35.11%	0.09506284	-4.549318454	6.89E-06

MULTIPLE REGRESSION SUMMARY
PRICE WFFT MODEL

R-square	0.7317	**sigma**	**F-stats**	median pred error	22.78%
Adj R-Square	0.7177	0.404	52.27 (24 & 460 df)	mean pred error	30.11%

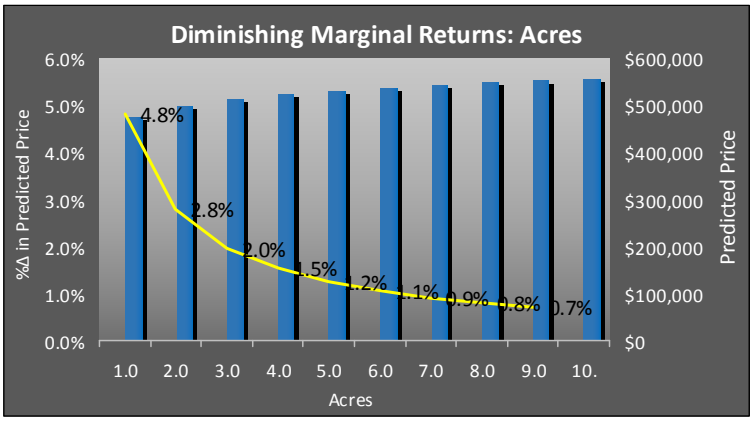
Variable	Estimate	Adjustment %	Std. Error	t value	Pr(>|t|)
(Intercept)	7.990422	7.99042	0.110744938	72.15157516	5.92E-253
log(acres)	-0.49861	-39.26%	0.025962099	-19.20536509	8.52E-61
wfratio	-0.00373	-0.37%	0.000251276	-14.84980978	4.95E-41
sjuan	0.632628	88.26%	0.05798057	10.91104009	8.31E-25
orcas	0.634982	88.70%	0.058419226	10.86939376	1.20E-24
lopez	0.421009	52.35%	0.058727967	7.168804782	3.03E-12
shaw	0.338142	40.23%	0.136980314	2.468540944	0.01392903
pisland	0.775863	117.25%	0.30160297	2.572465265	0.01041032
dus	0.147036	15.84%	0.029355709	5.008765329	7.82E-07
I(wetland_pct * 100)	-0.00396	-0.39%	0.00225993	-1.750809497	0.08064531
splitwf	-0.13048	-12.23%	0.077769705	-1.677742919	0.09407655
hbank	-0.20362	-18.42%	0.051122698	-3.983040635	7.91E-05
slp_gt60_pct	-0.60289	-45.28%	0.22727456	-2.652716553	0.00826079
dock	0.228544	25.68%	0.061058168	3.743059297	0.00020481
I(av_improv/10000)	0.031222	3.17%	0.002475121	12.61451665	1.54E-31
I(year == 2004)TRUE	-0.12724	-11.95%	0.095813976	-1.327969994	0.18484657
I(year == 2005)TRUE	0.03269	3.32%	0.096616218	0.338348045	0.73525529
I(year == 2006)TRUE	0.190209	20.95%	0.097377695	1.953311129	0.05138859
I(year == 2007)TRUE	0.423944	52.80%	0.100664144	4.211467606	3.05E-05
I(year == 2008)TRUE	0.171848	18.75%	0.108318026	1.586510305	0.11331073
I(year == 2009)TRUE	0.122643	13.05%	0.117482807	1.043922842	0.29706937
I(year == 2011)TRUE	-0.10384	-9.86%	0.124087765	-0.836857636	0.40310713
I(year == 2012)TRUE	-0.19447	-17.67%	0.108498853	-1.792356806	0.07373284
I(year == 2013)TRUE	-0.3381	-28.69%	0.108952528	-3.103206161	0.00203229
I(year == 2014)TRUE	-0.34734	-29.34%	0.249665638	-1.391232292	0.16482748

The Coefficient of Determination (R-square) measures the proportion of variance in the dependent variable which is explained by the independent variables, or how much better the model is in predicting price than the simple average values of the dependent variables. The Waterfront Foot model is marginally better in this regard, with an adjusted R-square of 0.7177, compared to 0.7075 for the Price model. The variables in the respective models explain roughly 71% of the variation in price per waterfront foot, and total price. These are surprisingly good results, given the afore-mentioned omitted variable bias and measurement issues.

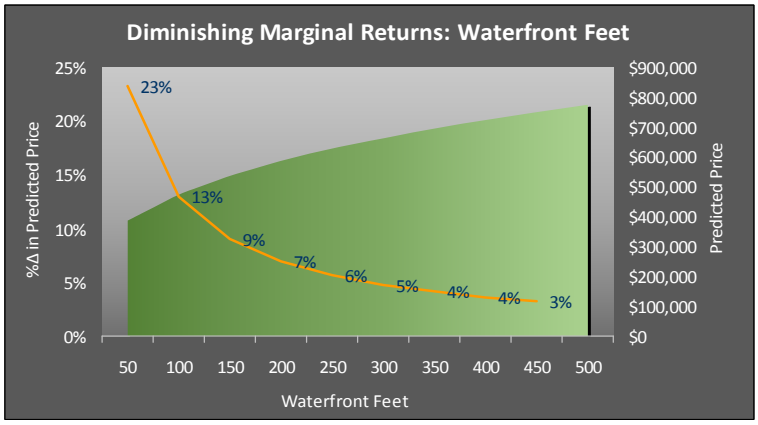
The coefficient of the estimates in the models indicate how much, and in what direction, the dependent variable changes when the variable increases or decreases, holding all other independent variables constant. In non-linear models, the coefficients represent percentage changes, rather than absolute or dollar changes. For indicator (dummy) variables, it is the percentage change or difference, from the base or default category. The coefficients are transformed to adjustment factors, which are the mathematically correct adjustments to use in percentage terms.

Focusing on the independent variables in the Price model, the following interpretations of the model results are made:

- Log (acres): the log form of the variable reflects a non-monotonic rate of change. In other words, there is not a 7% increase in price for every one unit increase in acreage (as the coefficient and adjustment factor seems to suggest), but rather a diminishing marginal increase in price as acreage increases. The relationship looks like this:



- Log (wfft): the adjustment factor (35.22%) relates to the log form of the variable and reflects diminishing marginal returns at a non-monotonic rate, such that it is not interpretable as a "one to one" change. In other words, there is not a 35% increase in price for every one unit increase in waterfrontage; rather there is a diminishing marginal increase in price with increasing length of waterfront. The relationship looks like this:



- Island location: the property location is treated as an indicator variable, with non-ferry islands (all combined) as the base category. Thus, the adjustment factors for the islands listed as variables indicate change in price relative to location on a non-ferry island. For example, the price of a waterfront parcel on San Juan Island is indicated to be 94% higher than a parcel having all the same other attributes located on a non-ferry served island. There is an approximate 54% increase in price for Lopez and Shaw Islands, and more than a three-fold price premium for a privately owned island.

- Density Units (dus): There is a 15.89% increase in price for every additional tax parcel or underlying density unit.[4]
- Wetlands (wetland_pct*100): wetlands are measured as a percentage of a property's total land area. There is a .43% decline in value for every one percentage increase in wetland coverage. By extension, a parcel which has wetlands across 10% of its land area is worth approximately 4.3% less than a property with no wetlands.
- Shoreline split by road (splitwf): A road passing through a parcel which separates the building site from the marine frontage has nearly a 20% negative impact on price/value.
- Bank Type (hbank): high bank properties are priced 13% lower than medium and low bank properties. There is not a statistically significant difference in price between low and medium bank properties within the dataset.
- Slopes (slp_gt60_pct): geologically hazardous slopes are measured as a percentage of a property's total land area that has slopes in excess of 60%. The values for this variable are input as decimals from 0 to 1 (rather than as a percentage from 0 to 100), such that the coefficient and adjustment factor corresponding to a value of 1 represents a property which is 100% comprised of steep slopes. Scaling the values in the same manner as the wetlands variable reveals a similar degree of impact: a parcel which has 10% (.10) of its land area categorized as geologically hazardous slopes, is worth approximately 6.5% less than a property with none.
- Dock: the private or shared use of a dock adds more than 30% to price.[5]
- Assessed value of Improvements (av_improv/10000): Every $10,000 of assessed improvement value adds 3% to price.
- Year of Sale: the sale date is also treated as an indicator variable, with 2010 as the base category. Thus, the adjustment factors for the other years indicate change in price relative to 2010. For example, the coefficients in the Price model indicate prices were nearly 16% higher in 2006 (coefficient =0.1479) and 16% lower (coefficient =-0.1760) in 2011, relative to 2010. The year 2010 was chosen as the base year because the variables are not as reliable beyond this time, due to declining number of observations. Though the year of sale variables are relevant to the development of the two price models in explaining price variation over time and capturing the interaction between the other independent variables, they do not affect the application of the models for the purpose of estimating current price. In other words, if the model is being used to predict the current price of property (rather than the price as of the year it sold), all of the year variables have a value of 0, and the model solves for price as of 2010 by default. [6]

With the exception of the substitution of waterfront ratio for waterfront feet, the same independent variables are used in the Waterfront Foot model, and the interpretation of their coefficients is similar, albeit with some differences in the magnitude of impact. Though the negative coefficient for log(acres) appears counterintuitive, in fact it is also consistent with the concept of diminishing marginal returns. As a means of illustration, if the acreage of a parcel

[4] Both logic and the market suggest that there are diminishing marginal returns with increasing the number of underlying density units. Therefore, this variable may be more accurately expressed in log form.

[5] In linear models using a dataset of vacant parcels which indicate absolute changes in the dependent variable, the contributory value of a dock was found to be between $212,000 and $275,000. .

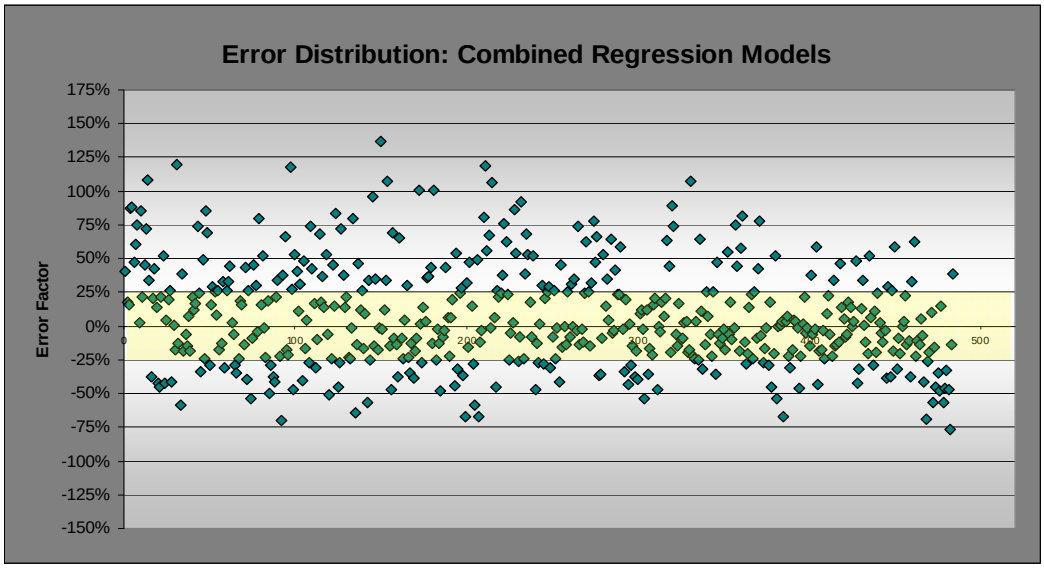
[6] The need to manually adjust for current value is addressed below.

increases, there would also need to be an increase in the length of water frontage in order to keep the waterfront ratio constant. Given that there is a decrease in the marginal value of each additional linear foot of frontage, the model predicts a lower price per linear foot. In other words: additional acreage = additional shoreline = less value per foot of shoreline.

The two models result in different outcomes (predicted prices) for a property with the same given set of attributes, and are most divergent with properties having low waterfront ratios (i.e., long, narrow parcels). For this reason, averaging the two results may be preferable as an aggregate tool.

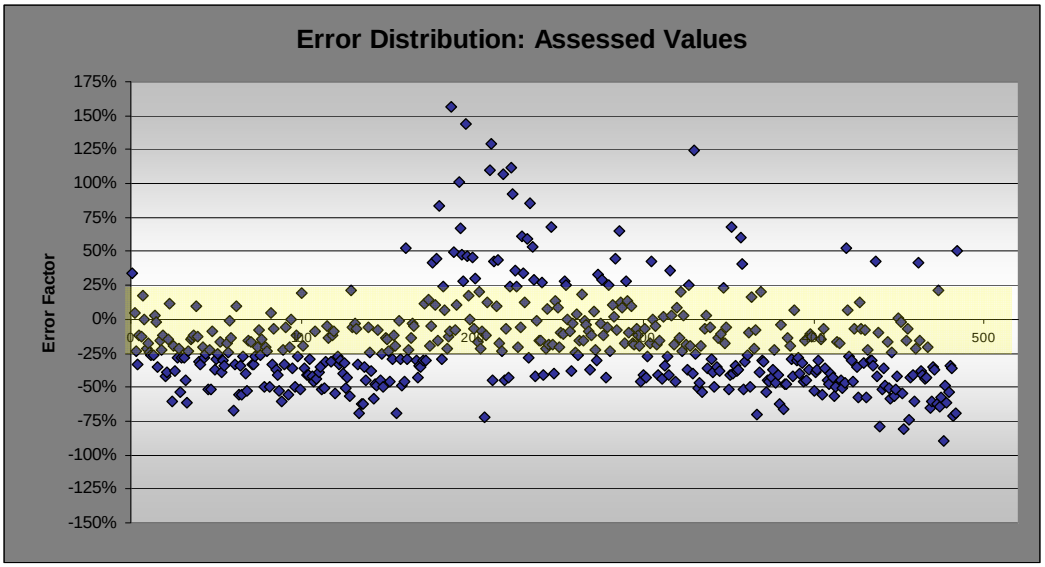
Examination of Prediction Errors

Despite the strong explanatory power of the two models, their reliability for predicting price/value is diminished by high residual errors. The residual error is calculated by comparing the value resulting from the regression equation with the actual sale price. On average, the two models predict values 27% and 30% above the actual sale price. The prediction errors for the combined model are plotted in the chart below and mapped by location in the accompanying graphic.



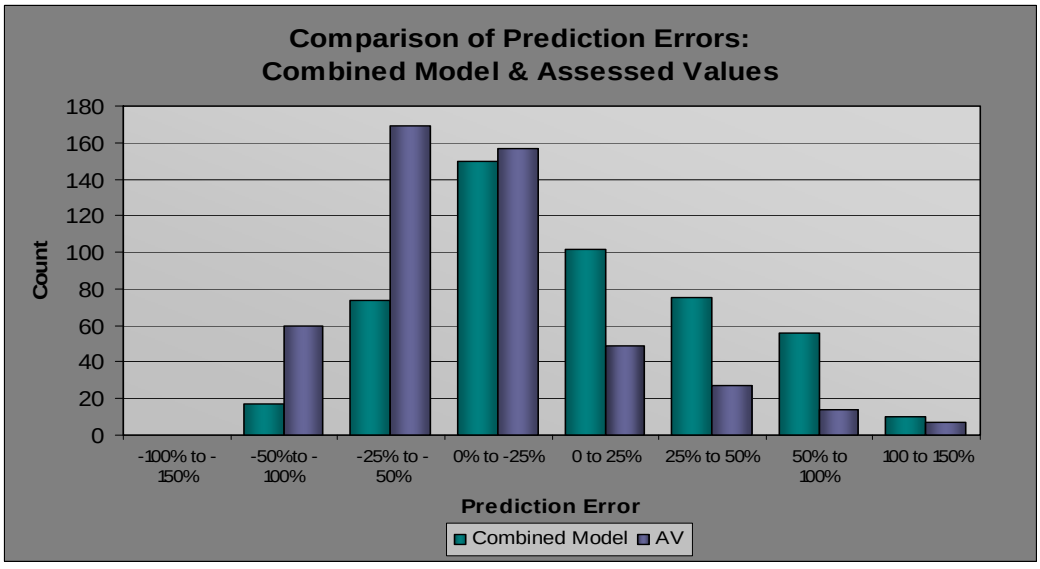
The error factors are expressed as the percentage difference between the predicted price resulting from the regression and the actual price. The data points within the yellow shading are observations where the regression predicted price within 25% above or below actual price. As the number of data points outside this range shows, there are many instances of high prediction error, with a greater tendency toward over-estimation than under-estimation.

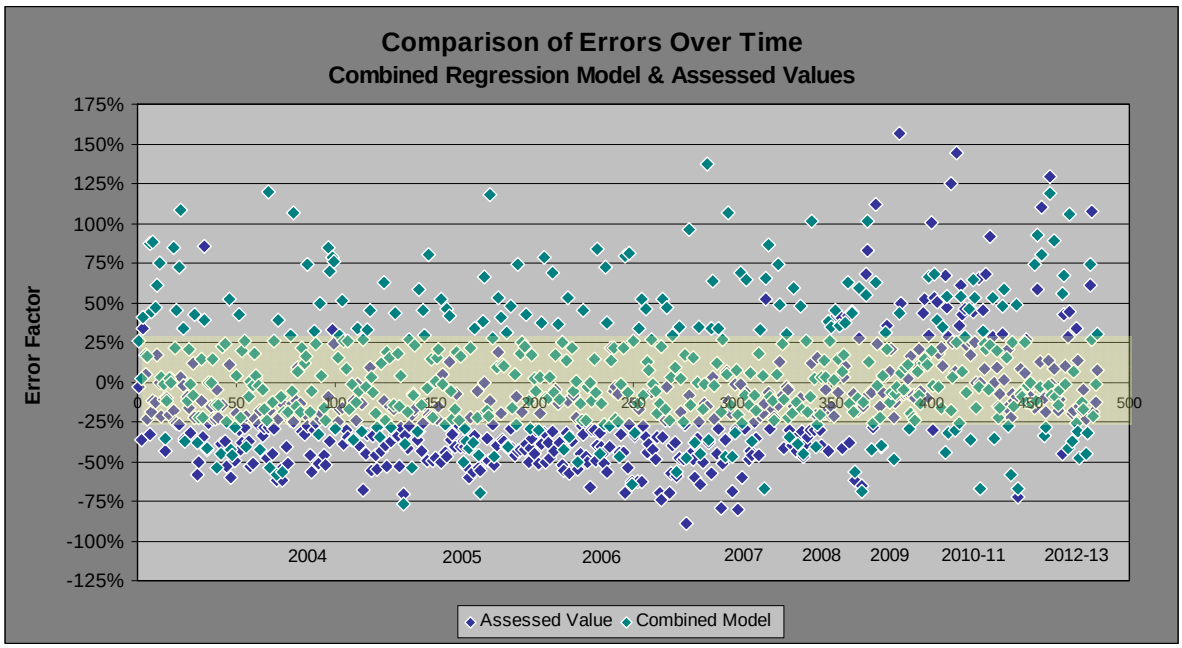
A similar plotting is made of the errors in assessed values, which are calculated by comparing the assessed value as of the year of sale with the sale price. The frequency and magnitude of the assessment error is also high, with a greater tendency to under-estimate value relative to the price paid.



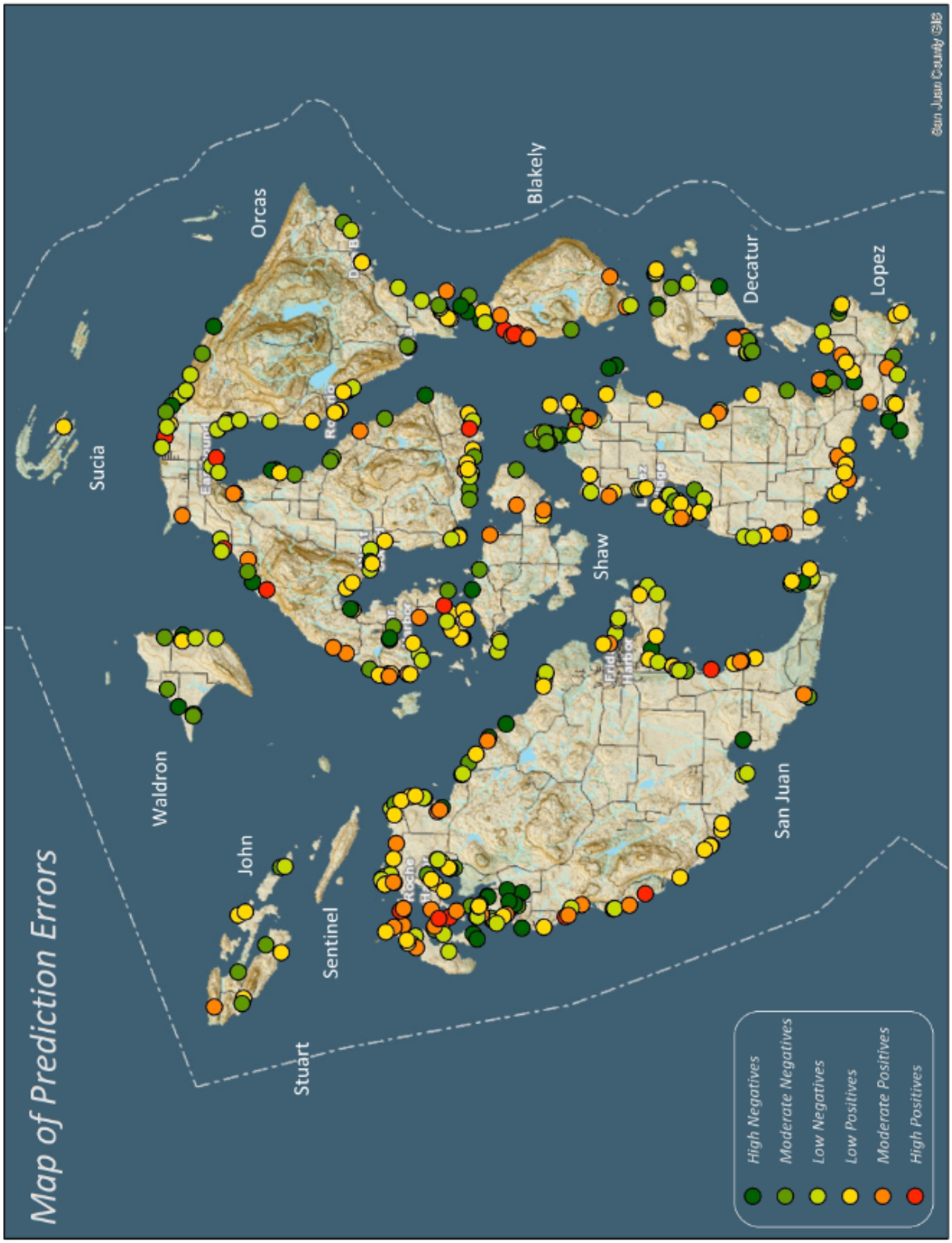
The error factors are expressed as the percentage difference between the assessed value as of year of sale and the actual price. The data points within the yellow shading are observations where the assessed value is within 25% above or below the price paid. As the number of data points outside this range shows, there are many instances of high estimation error, with a greater tendency toward under-estimation.

A comparison between the combined regression models and assessed values is also made by examining the number of estimation errors within established ranges and plotting both sets of errors on the same scatter plot.





The error factors are expressed as the percentage difference between the regression predicted prices (green symbols) and assessed values (blue symbols) and the actual sale price. The horizontal access depicts year of sale (the observations are not evenly distributed over time).The plotting reveals the assessment errors to be fairly consistent within the range of -25% to -50% until about 2008, when they become both more divergent and tend toward over-estimation. The regression model errors are generally more dispersed with no discernable change over the time frame.



Note: negatives denote over estimations on this map; positives denotes under estimations.

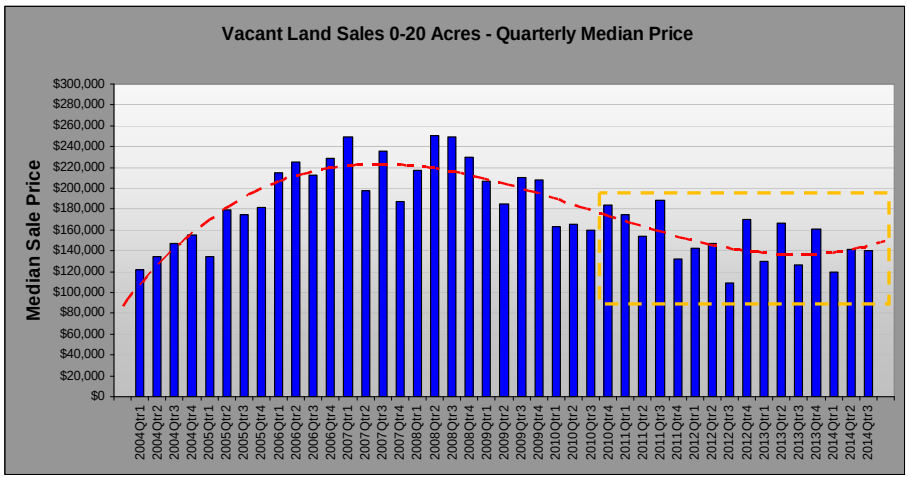
Adjustment of Model for Current Values

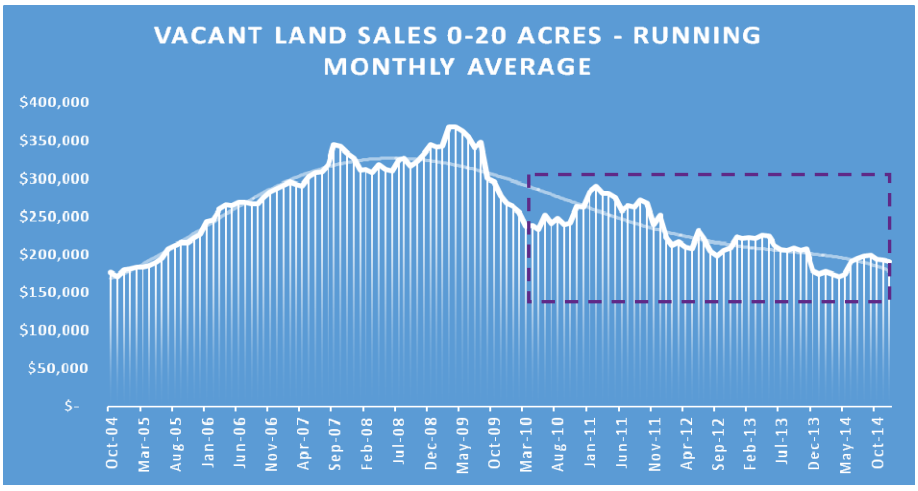
The base year in the regression models is 2010, with less reliability in the coefficients associated with the years subsequent to this time. Application of the model to predict current values, or values beyond the observations in the dataset (through 2013) necessitates consideration of an adjustment relative to the base year.

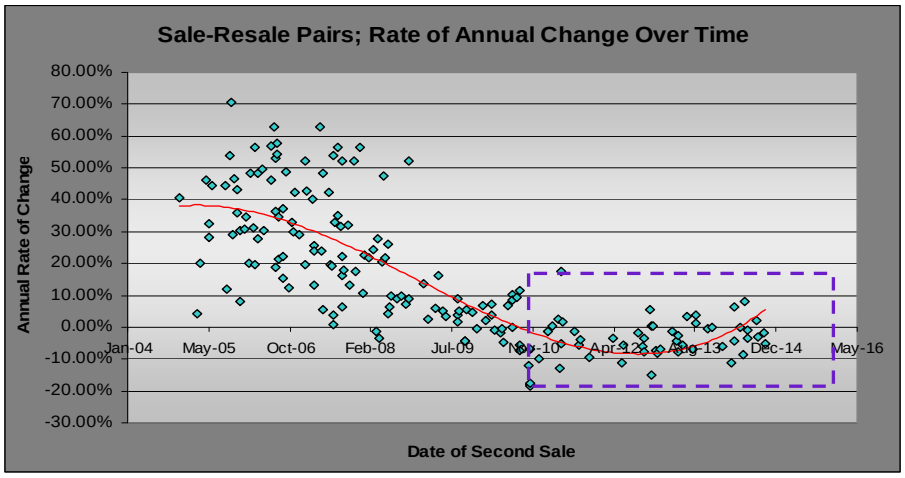
Indicated Adjustments Relative to 2010 (Hedonic Models)

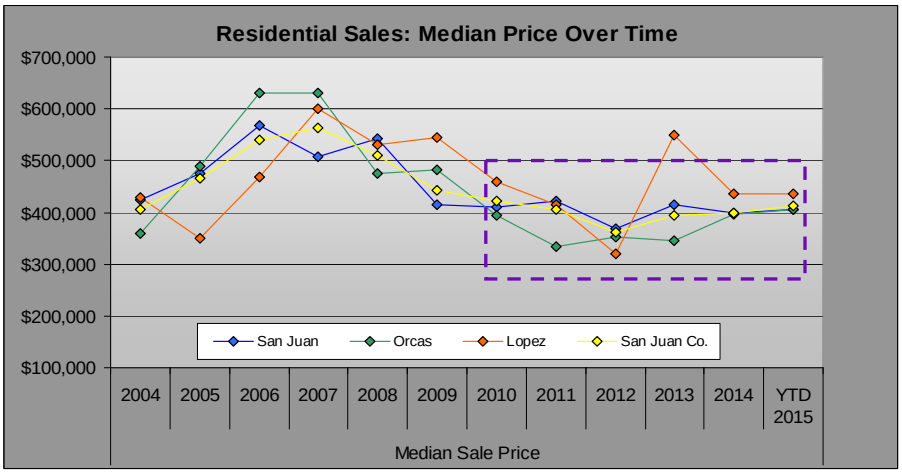
	2011	2012	2013	2014	2015
Price Model	-16.1%	-23.2%	-35.1%	insufficient data	?
WFFT Model	-9.9%	-17.7%	-28.7%	insufficient data	?

Though the scope of this study does not include a comprehensive analysis of real estate price trends over time, there are a number of alternative sources of data and analytical perspectives that may be employed to examine changes in value and derive an adjustment factor. A few of these datasets and perspectives are presented in the following series of charts.









As these charts demonstrate, there is some variability in the data trends, which lead to different conclusions regarding changes in land prices since 2010. Indeed, most real estate analysts will likely agree there is no one definitive set of evidence or answer to this question, especially as it pertains to waterfront property. The coefficients of the two hedonic models indicate fairly high price depreciation from 2010 through 2013, with insufficient data in 2014, and no data beyond that from which to derive a more current adjustment factor. For the purposes of reporting the results of this study and assessing the accuracy of the model's application to a sample of properties, an adjustment factor of -20% is applied to the combined model's solution (base year 2010) to yield a price indication for year 2015.[7] Application to a broader sample, real case/s, or subsequent years requires re-examination of the adjustment factor.

[7] The -20% adjustment factor was reconciled from the author's more detailed consideration and analysis of the datasets depicted in the presented charts, in addition to other statistical and anecdotal market evidence.

III. MARINE FRONT & MARINE VIEW PARCEL COMPARISONS – VALUE ATTRIBUTABLE TO SHORELINE OWNERSHIP

The value of a waterfront property is a function of having a viable residential building site, a marine view from that building site or elsewhere within the parcel, and either exclusive or shared private access to and use of the shoreline. Because the typical restrictions contemplated under the neighborhood shoreline conservation easement acquisition program are not intended to interfere with the use of and/or view from an existing building site, nor extinguish the potential to develop a building site on a vacant parcel, there is little to no diminutive impact to these benefits of ownership. Rather, the impact is focused on the access to and use of the shoreline. For this reason, analysis was conducted to determine what proportion of the total value of a marine frontage property is attributable to ownership of the shoreline. This relationship is examined by a series of paired sales which matches a waterfront parcel with a parcel that is similar in most other attributes, but lacks marine frontage, and compares the price paid for each. Using the same database of vacant and modestly improved waterfront sales, over fifty of the properties were initially matched with sales of proximate non-frontage properties with marine views. The pairings were winnowed down to include only vacant parcels to avoid potential error in adjusting for differential quality and size of improvements, and effort was made to minimize the number of matched pairs that transacted during periods of different market conditions. Using sales with different transaction dates is unavoidable, as few of the best physically matched properties sold within one year of each other. Adjustments were made to these matches to equilibrate their sale dates, based on price trend analyses of the previous referenced datasets.[8] By design, the final set of matched pairs includes examples of low, medium and high bank properties.

The matched pair selection and price comparison process is illustrated by introduction of two of nineteen matched pairs that made the final analysis pool.

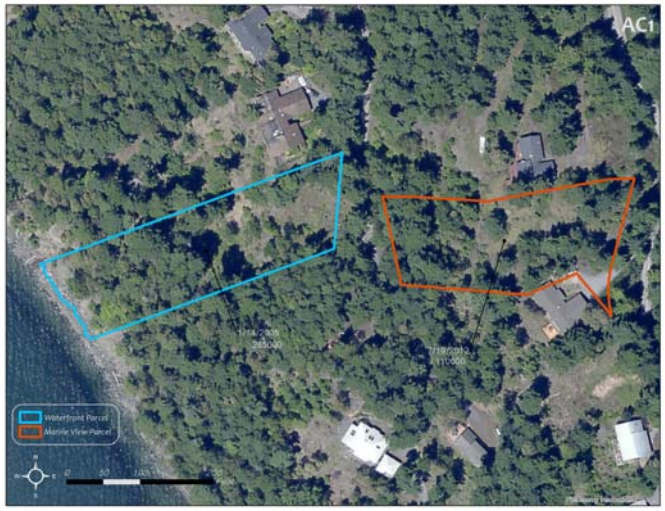
[8] The adjustment is not made based on the length of time between the two sales, but rather the difference in market conditions at the time of the sales. For example, no adjustment is made to a 2011 sale matched with a 2013 sale because both occurred during relatively stable (albeit depressed) market conditions. In contrast, a significant adjustment is warranted for a 2010 sale matched with one occurring three years prior in 2007. Land prices in 2013 were at similar levels as they were in 2005, resulting in only a minor adjustment, despite an eight year time difference.

Matched Pair "M"

Matched Pair M	Marine Front	Marine View
Parcel Number	170752029000	170743006000
Location	Orcas-E	Orcas-E
Size Acres)	0.57	0.37
Exposure/View	NE	NE
WFF	101	
WFF Ratio	177 ft/ac	
Shoreline Zone Ratio	81%	
Bank Type	low bank	
Distance to shoreline		0.04 mi
Sale Date	10/29/2010	8/20/2010
Sale Price	$475,000	$114,000
Adjusted Price	$475,000	$114,000
Adjusted Price/Acre	$833,333	$308,108
Marine View to WF	Total	Unit Price
Price Difference	24%	37%

The marine view parcel sold for 24% of the total price and 37% of the unit price (price per acre) of the low bank marine frontage parcel. Relying on the unit price measurement (accounts for size difference), this matched pair suggests that 37% of the overall value of a waterfront property is attributable to a view building site, and 63% of the overall value is attributable to the shoreline ownership of a low bank parcel.

Matched Pair "AC-1"



Matched Pair AC-1	Marine Front	Marine View
Parcel Number	173154036000	173154040000
Location	Orcas-EC	Orcas-EC
Size Acres)	1.24	0.86
Exposure/View	SW	SW
WFF	125	
WFF Ratio	101	
Shoreline Zone Ratio	46%	
Bank Type	high bank	
Distance to shoreline		0.082
Sale Date	1/14/2005	7/19/2012
Sale Price	$285,000	$110,000
Adjusted Price	$230,000	$110,000
Adjusted Price/Acre	$185,484	$127,907
Marine View to WF	Total	Unit Price
Price Difference	48%	69%

After adjusting for different sale dates/market conditions, the marine view parcel sold for 48% of the total price and 69% of the unit price (price per acre) of the high bank marine frontage parcel. Relying on the unit price measurement (accounts for size difference), this matched pair suggests that 69% of the overall value of a waterfront property is attributable to a view building site, and 31% of the overall value is attributable to the shoreline ownership of a high bank parcel.

The price differences for the eighteen matched sale pairs are converted to the percentage of overall price/value attributable to the shoreline ownership and charted by bank type and

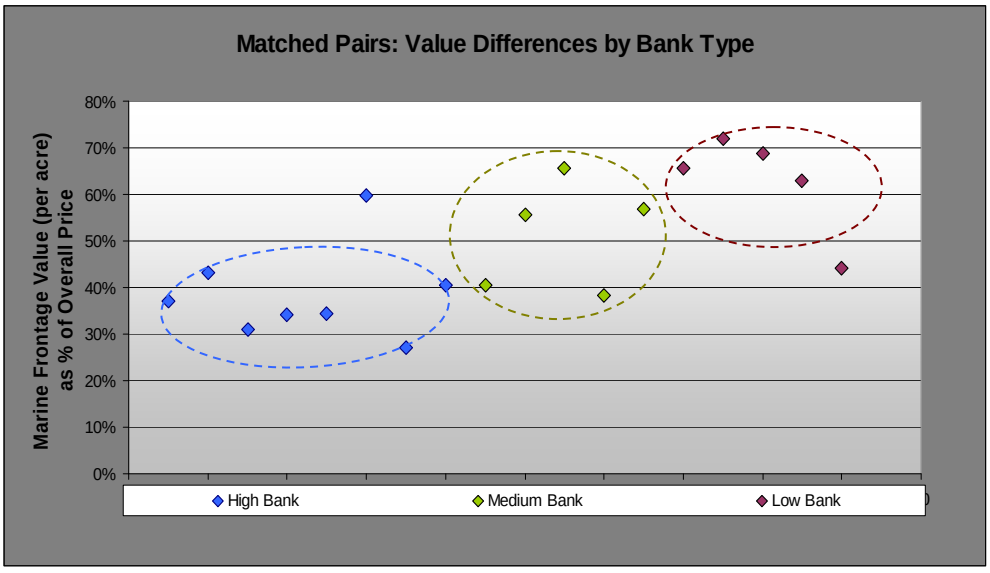
frontage to upland ratio in the graphs below. The median and average percentages in respect to total and unit price (price per acre) are as follows:

Marine Frontage Value as a Percentage of Total Price

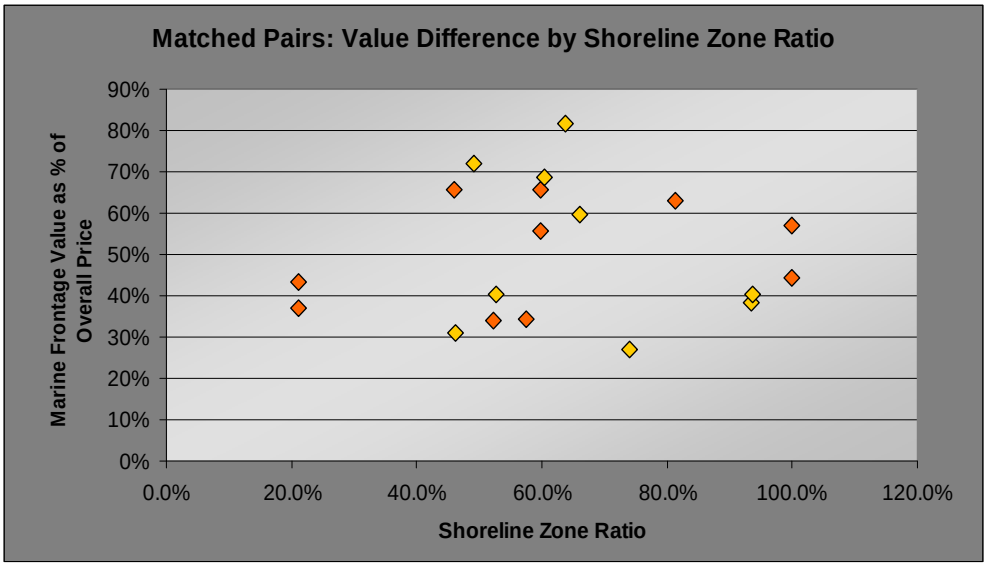
	High Bank	Medium Bank	Low Bank
Average Price	48%	52%	49%
Median Price	51%	57%	49%
Average Price/Acre	38%	51%	63%
Median Price/Acre	36%	56%	66%



Generalizing from these measures of central tendency, it can be concluded from this data that the proportion of overall value of a marine frontage property attributable to shoreline ownership – over and above a view building site – is in the vicinity of 40% for high bank, 55% for medium bank, and 60% for low bank properties.



As expected and revealed in the measures of central tendency, the proportion of overall value attributable to shoreline ownership is less for properties with high bank frontage than for medium and low bank properties where the shoreline is more accessible. Ownership of the shoreline for a parcel having a very high and steep bank may contribute very little additional value/price over a good marine view site.



An upward trend line is expected given that the value of waterfront properties tends to increase with an increase in the shoreline ratio, but there is no apparent relationship here. The yellow symbols indicate matched pairs where market conditions adjustments were applied.

The two outlined parcels are not among the matched sale pairs, but presented here to illustrate an extreme example of differences in shoreline to upland ratio. With 8.78 acres and 221 feet of frontage, the parcel to the north has a shoreline ratio of 25 feet per acre. The parcel to the south has 21.24 acres and 2,224 feet of frontage, giving it a ratio of 104 feet per acre.

IV. ANALYSIS OF CONSERVATION EASEMENT APPRAISALS & DIMINUTION FACTORS

Appraisals on file with the San Juan Preservation Trust pertaining to a number of marine front properties on which they hold a conservation easement were examined to obtain specific information relevant to the shoreline easement valuation study. The appraisals were conducted on behalf of the landowners or the Preservation Trust for the purpose of estimating the value of a conservation easement which was granted to the SJPT by either donation or sale. Thus, the appraised values established the basis for either a charitable contribution or purchase price. The properties subject to appraisal are located on various islands throughout the archipelago, range in size from several acres to nearly 150 acres, and have effective valuation dates going back ten years. These appraisals represent the best record of conservation easement values within the market area and offer some authoritative guidance for establishing a range in diminution factors.

Information was gleaned from the waterfront property appraisals in order to examine the following value parameters:[9]

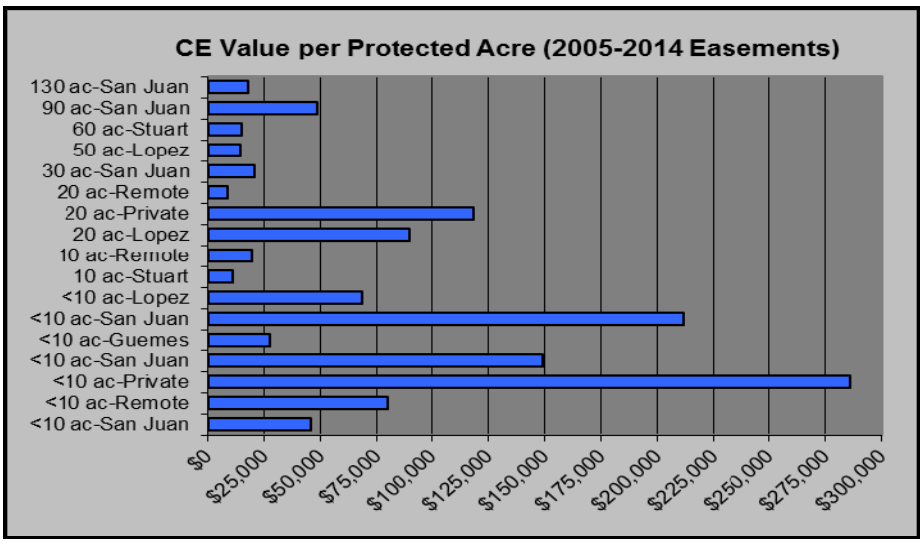
1. range in price/appraised value per acre under easement;
2. range in price/appraised value per extinguished density unit;
3. discernable patterns in encumbered value and diminution ratios relative to conservation easement restrictions;

The appraisals were additionally perused to find any precedent for values attributed to conservation easements which impose restrictions on land use and activities without extinguishing or reducing residential density rights.

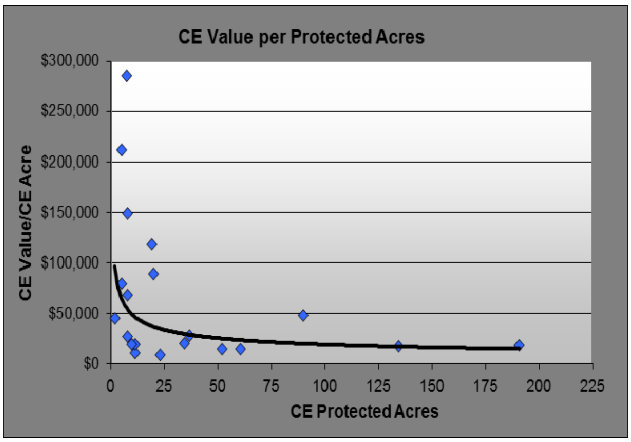
The range and distribution of the three examined parameters are presented in a set of charts on the following pages.

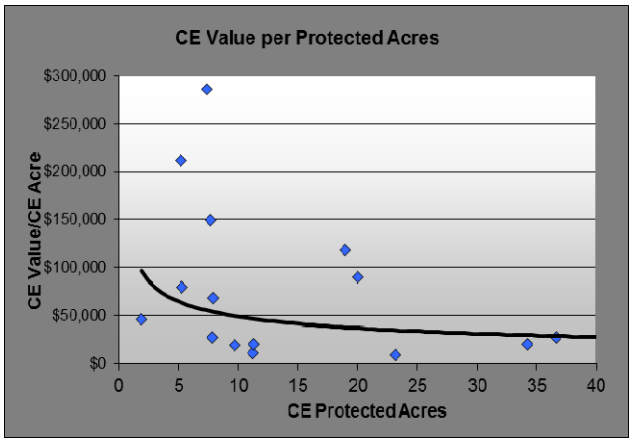
[9] Given the confidential nature of the appraisals and appraisal conclusions, the properties are identified here by general descriptors.

Conservation Easement Value per Protected Acre



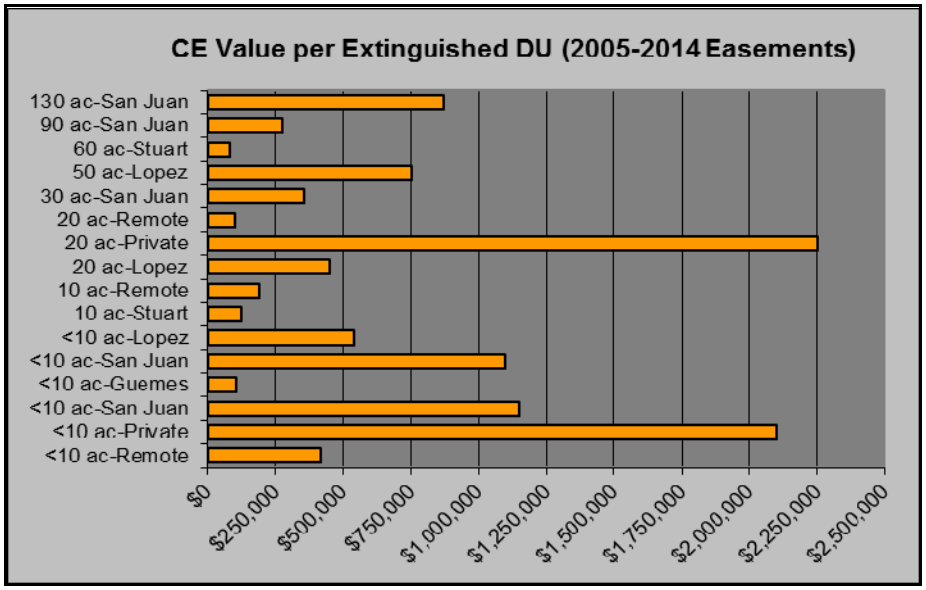
There is a considerable range in value per CE-protected acre, which is variable across island location and the size of the easement area. The range is too disparate to draw meaningful conclusions from the measures of central tendency (average and median). Rather, these unit values are specific to the interaction between the site and easement restrictions.



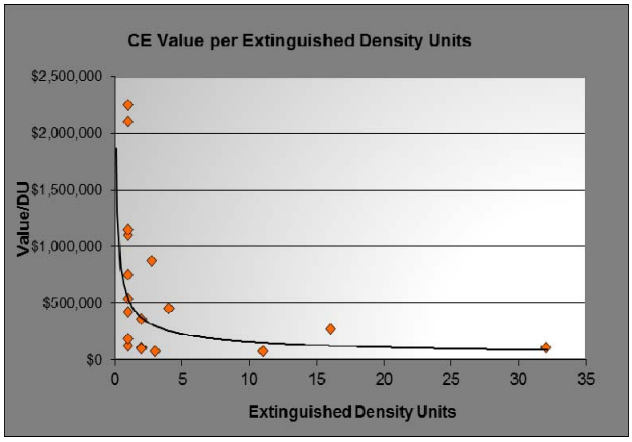


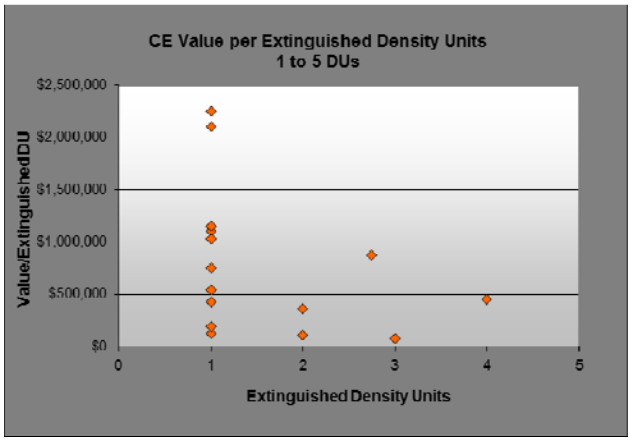
The unit value decreases with an increase in the protected acreage. The diminishing marginal returns is more pronounced across the entire size spectrum than among the more typical easement area of 10-40 acres.

Conservation Easement Value per Extinguished Residential Density Unit



This chart graphs the appraised value of the conservation easement per number of residential density units that the easement extinguishes. For example, a conservation easement valued at $500,000 which extinguishes two density units yields $250,000 per extinguished density unit. Like the acreage distribution, the range is too disparate for the measures of central tendency to be a useful reflection of the data.

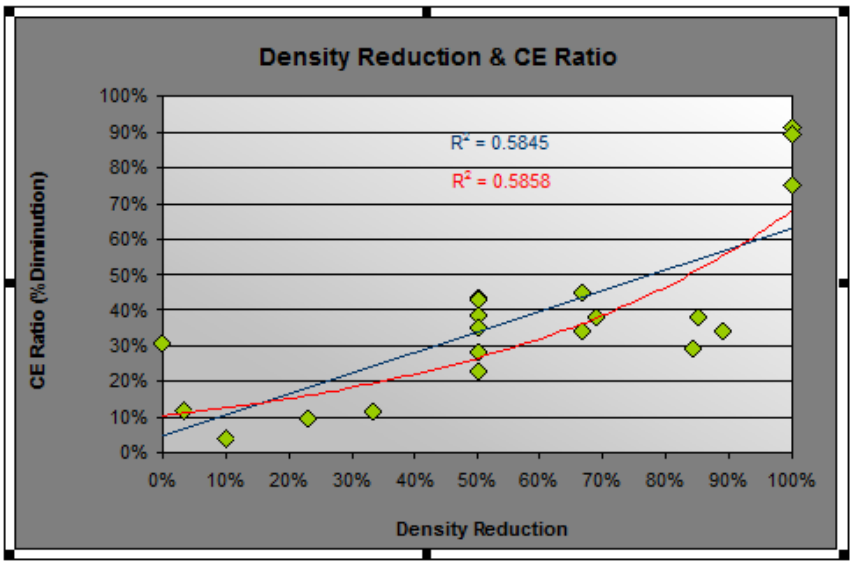




The unit value generally decreases with an increase in the number of extinguished density units. However, among the appraisals reviewed, the majority of the conservation easements extinguish only one density unit, with unit values which span the entire value spectrum.

Among the appraisals examined, all but one of the conservation easements reduce the residential development rights on the properties they encumbered by some degree, in addition to imposing other land use restrictions and obligations. The reduction in development rights ranges from one of 29 underlying density units (3%) to extinguishing all of a property's development rights (100%). The reduction in property value – or diminution attributable to the easement – ranges from 4% to 91% of the property's appraised unencumbered value. The easements generally illustrate increasing diminution in value as the conditions of an easement more severely constrain the use of the property; however, the relationship between reduction in development rights and value diminution is not always intuitively consistent. By their nature, conservation easements have different impacts on different properties and may address very site specific features or restrictions. For example, a conservation easement which extinguishes 50% of the residential density and restricts the retained building sites to a location without a marine view has a more significant value impact than an easement on another property which results in the same 50% reduction in density but without affecting the view from the retained building sites.

Despite these inconsistencies, it can be concluded from the appraisals examined that the percentage diminution in value rarely exceeds the percentage reduction in development rights, and the relationship between decreased density and value diminution is rarely one to one (in other words, a 50% decrease in density does not equate to a 50% loss in value). The intercepts of the percentage density reduction and diminution factors are shown in the following chart, along with a linear and non-linear trend line:



Only one of the appraisal case studies addresses a conservation easement which does not reduce the number of underlying density units (in this case there is only one). The easement, which does restrict the location of a future building site and prohibits any structures in the protected area, was valued at 31% of the property's appraised unencumbered value. While this is the most analogous to the contemplated neighborhood shoreline easements which will not typically reduce residential density, it is precarious to draw conclusions from a single observation. Three of the other case studies involve conservation easements which encumber only a small portion of a larger ownership tract, which result in extinguishing only one or a small number of density units, while leaving the development rights of the larger remainder

area intact. Properties which retain 75% or more of their overall development rights exhibit value diminution factors of only 5% to 12%.[10]

The middle range in the conservation easement diminution factors are associated with properties which suffer some reduction in residential density but retain one or more building sites in optimal locations, with several exhibiting the requisite characteristics and amenity of a premier waterfront estate. These easements have been valued at between 23% and 45% of unencumbered value.

Relevant to the neighborhood shoreline conservation easements, a diminution factor may be applied either to the unencumbered value of the whole parcel or just to the shoreline area which is subject to the land use and modification restrictions. The pertinent information gleaned from the record of conservation easement appraisals to these alternative applications is:

1. Value diminution factors for conservation easements which do not substantively reduce residential density across a larger ownership tract range from 5% to 12%. While one case study indicates 30% diminution in value to a small parcel with no reduction in development rights, several other examples where at least one development right was extinguished indicate a cap at about 25%. Thus, if the diminution factor is applied to the property as a whole, precedence suggests a range of 5% to 25%.
2. The value of an easement (e.g. diminution factor) generally increases with the degree of land use restrictions and encumbrances imposed within the protected area. If one considers the proportionate reduction in residential density to be roughly synonymous to the proportionate degree of reduced utility, then the shoreline easements are most analogous to conservation easements which only partially reduce development rights, while retaining a high level of utility to the remainder. If the diminution factor is applied to only the shoreline area, precedence suggests a range of 25% to 45%.

   Alternatively, if the easements are perceived to reduce the shoreline uses and utility by 25% to 50% (see prohibited uses and activities, below) this corresponds to a value diminution of 20% to 35% on the Density Reduction-CE Ratio trend line.

Description of Shoreline Conservation Easement – Pilot Program

Though a Deed of Conservation Easement necessarily addresses conditions and stipulations which are specific to the property it encumbers, the contemplated shoreline conservation easements under the Pilot Program are intended to fulfill the same protection purposes and impose similar degrees of shoreline restrictions on properties at a neighborhood scale. As a general case, the primary terms and conditions of the shoreline conservation easement, taken from the Draft instrument provided by the client, can be briefly summarized accordingly:

- The purpose of the easements is to protect the natural shoreline features, dynamic nearshore processes, shoreline and nearshore habitat, and scenic open space.
- The protected area (within easement boundaries) is confined to the shoreline zone, as defined by 200 feet inland from the ordinary high water.

[10] It is safe to conclude that if only the land area subject to the conservation easement restrictions was being appraised, these diminution factors would be significantly higher, and more in line with the observations having no reserved development rights..

- The easement is conveyed in perpetuity and transfers with title to all future owners of the property.
- The Grantor reserves all development rights that are allocated to, implied, reserved, or inherent in the remainder property. The easement does not extinguish residential development rights nor exclude the protected area from the calculation of allowable density on the property as a whole. However, the protected shoreline area may not be subdivided.
- Upon written notice, Grantee shall have the right to enter the protected property for the purposes of monitoring compliance with and enforcing the provisions of the easement, and to conduct Grantor-approved educational and scientific activities. However, no right of public access is granted.

Permitted and Reserved Uses & Activities within the Protected Area

- Maintenance, repair and/or replacement of any existing structures within the protected area;
- Noncommercial forest management to maintain forest health and safety, and occasional harvest of forest products for personal use on the property, providing such activities do not result in new openings in the forest cover;
- Construction and use of pedestrian trails;
- Legally permitted archaeological investigations with the oversight of a professional archaeologist

Prohibited Uses & Activities within the Protected Area

- Construction or placement of any new buildings or structures;
- Division, subdivision, or any process by which the protected property is divided into lots or which result in title to different portions of the protected property being held by different owners. *Note:* This restriction does not prohibit subdivision of the property as whole as long as the easement area lies wholly within one of the newly created lots of the property;
- Alteration of land or shoreline through the excavation or filling, dredging, shoreline armoring, bulkheads, hardening of the shore, alteration of the coastal sediment input/transport/deposition regime; pond construction;
- Construction of roads, trails, or paths for vehicular use;
- Construction or placement of pilings, docks, boat ramps, or beach access structures;
- Placement of utility lines, pipes, wires, fuel tanks, septic tanks, or septic drain fields;
- Removal of trees, clear-cutting or any other form of commercial logging, gathering of wood or other vegetation, cutting of snags or over-mature trees (unless otherwise permitted);
- Removal of marine riparian vegetation, including herbaceous understory and plant material overhanging the beach;
- Commercial recreation, public camping;
- Operation of motorcycles, ATV's, dune buggies, snowmobiles, or any other type of motorized recreational vehicles

V. APPLICATION OF HEDONIC MODELS & DIMINUTION FACTORS

Integrating the results of the various research and analytical components provides a framework for considering a range in value diminution attributable to a "general case" shoreline conservation easement on a waterfront lot. The process involves five steps:

1. Identify and measure the relevant attributes of the property that serve as the significant independent variables (acres, lineal feet of waterfrontage, island, % wetlands, road split, etc.).
2. Use the hedonic models to "predict" the value of the property, on the basis of total price and price per waterfront foot. Reconcile using the average of the two results or other weighting criteria.
3. Subtract the assessed value of the improvements, if any, to obtain value attributable to land, and adjust for current market conditions (relative to 2010).
4. Adjust for the proportion of total land value associated with ownership of the shoreline area, based on the ratios derived from the matched sale pairs for different bank types.
5. Apply diminution factor relative to bank type and degree of restrictions

The steps are applied to four sample properties having different bank characteristics and island locations in the attached Exhibits. The medium bank parcel on Waldron Island was selected because it is one of the properties included in the Pilot Project area; the other three parcels were more or less randomly selected from the waterfront sale database in order to have a representative example of each bank type (low, medium, high), both vacant and improved parcels, and parcels with both recent and older sale dates. These properties have not been specifically targeted for acquisition of shoreline conservation easements by the SJPT and FOSJ, and are presented here merely for the purpose of illustrating the application of the hedonic model and easement diminution factors, and examining the results relative to other value benchmarks. The base property and shoreline conservation value indicators in the examples *are not the result of an appraisal and are not expressed as opinions of market value for the full or partial interests.*

The four examples demonstrate the variability in the accuracy of the hedonic model in predicting price relative to current assessed values[11] and/or a recent sale price. In cases where the model results are substantively higher or lower, these benchmarks may be more reliable for purposes of estimating the base property value from which to apply the diminution factors.

Determination of a diminution factor attributable to the shoreline conservation easement within the range indicated by the appraisal case studies is necessarily site specific, and depends on how the easement's restrictions impact the use and enjoyment of a particular property's shoreline. It should be recognized that the same restriction on placement of a beach access structure may have a more detrimental impact on a medium or high bank property than on a low bank property where such structures are not necessary to facilitate beach access. Similarly, since the conservation easements do not require removal of existing

[11] In the examination and comparison of prediction errors discussed above, both the model results and the assessed values were representative of the year of sale. The indicators presented here reflect the manual adjustment made to the combined hedonic model, relative to the base year, and assessed values as of 2015. Unlike the examination of prediction errors, the variance of these indicators from sale price is not being measured or evaluated, and both may be expected to differ from the prior sale price, relative to the difference in prevailing market conditions.

structures, properties with established residential building sites within the shoreline area are less affected than vacant parcels, or parcels having sub-optimally located building sites where any new construction within the shoreline area is prohibited. Clearly, a restriction on vegetation removal which acts to impair the view potential from a building site on one property warrants a higher diminution factor than the same restriction on a property for which the primary view shed is unaffected.

The value impact of a shoreline conservation easement which directly or indirectly results in a reduction in residential density or the potential of a property to be subdivided is not reflected in the range suggested in the examples and requires separate application and/or independent analysis.

Exhibit Example A

Property Descriptors	
Location	Waldron
Acres	3.77
WF Feet	242
WF Ratio	64.19
Bank Type	low bank
Density Units	1
Split WF	no (0)
Dock	no (0)
% Wetlands	0
% Haz Slopes	0%
AV Improvements	$13,970
Last Sale Date	[NA]
Last Sale Price	[NA]

AV Total (current)	$294,820	
AV Land (current)	$280,850	
Combined Model	$365,062	
Mkt Conditions Adj (2010)	-20%	
Adjusted to Current Year	$292,050	
Allocation to Land	$278,080	

Shoreline Easement Estimate		
Base Value (Model)	$280,000	
Proportion to Frontage	60%	(low bank)
Value to Frontage	$168,000	
CE Diminution Factor	20%	40%
CE Value	$33,600	$67,200
CE % of Total Value	12%	24%

In this example, the combined hedonic model indicates a value for the parcel which is nearly equivalent to the current assessed value (there is no prior sale to use as a benchmark). However, both estimates are higher than that indicated by an appraisal.

Determination of the diminution factor within the range specified depends on how the easement's restrictions impact use and construction non-residential structures in the shoreline.

Exhibit Example B

Property Descriptors	
Location	San Juan
Acres	2.65
WF Feet	215
WF Ratio	81.13
Bank Type	high bank
Density Units	1
Split WF	no (0)
Dock	no (0)
% Wetlands	0
% Haz Slopes	25%
AV Improvements	$0
Last Sale Date	12/30/2011
Last Sale Price	$600,000

AV Total (current)	$636,240	
AV Land (current)	$636,240	
Combined Model	$574,428	
Mkt Conditions Adj (2010)	-20%	
Adjusted to Current Year	$459,542	
Allocation to Land	$459,542	

Shoreline Easement Estimate		
Base Value (Model)	$460,000	
Proportion to Frontage	40%	(high bank)
Value to Frontage	$184,000	
CE Diminution Factor	20%	40%
CE Value	$36,800	$73,600
CE % of Total Value	8%	16%

In this example, the combined hedonic model indicates a value for the parcel which is substantively lower than the recent sale and current assessed value. Consideration of these other benchmarks is appropriate.

Determination of the diminution factor within the range specified depends on how the easement's restrictions impact access to the shoreline and forest cover removal to retain view from a building site.

Exhibit Example C

Property Descriptors	
Location	Orcas
Acres	6.79
WF Feet	437
WF Ratio	64.36
Bank Type	medium
Density Units	1
Split WF	no (0)
Dock	no (0)
% Wetlands	0
% Haz Slopes	3%
AV Improvements	$113,470
Last Sale Date	4/30/2012
Last Sale Price	$937,500

AV Total (current)	$858,620	
AV Land (current)	$745,150	
Combined Model	$1,156,465	
Mkt Conditions Adj (2010)	-20%	
Adjusted to Current Year	$925,172	
Allocation to Land	$811,702	

Shoreline Easement Estimate		
Base Value (Model)	$810,000	
Proportion to Frontage	55%	(med bank)
Value to Frontage	$445,500	
CE Diminution Factor	20%	40%
CE Value	$89,100	$178,200
CE % of Total Value	11%	22%

In this example, the combined hedonic model, after adjustment relative to the base year, indicates a value for the parcel which is higher than the current assessed value, but lower than the recent sale price. When the year of sale (2012) was used as a variable, the result of the combined model was within 7% of the sale price.

Determination of the diminution factor within the range specified depends on how the easement's restrictions impact beach access structures.

Exhibit Example D

Property Descriptors	
Location	San Juan
Acres	0.48
WF Feet	93
WF Ratio	193.75
Bank Type	low
Density Units	1
Split WF	no (0)
Dock	no (0)
% Wetlands	0
% Haz Slopes	0%
AV Improvements	$164,360
Last Sale Date	5/22/2006
Last Sale Price	$840,000

AV Total (current)	$514,080	
AV Land (current)	$349,720	
Combined Model	$714,542	
Mkt Conditions Adj (2010)	-20%	
Adjusted to Current Year	$571,634	
Allocation to Land	$407,274	

Shoreline Easement Estimate		
Base Value (Model)	$410,000	
Proportion to Frontage	60%	(low bank)
Value to Frontage	$246,000	
CE Diminution Factor	20%	40%
CE Value	$49,200	$98,400
CE % of Total Value	12%	24%

In this example, the combined hedonic model, after adjustment relative to the base year, indicates a value for the parcel which is 11% higher than the current assessed value. The prior sale date (2006) is too old to be a current value benchmark.

Determination of the diminution factor within the range specified depends on how the easement's restrictions impact use of the shoreline. In this case, the location of the existing residence within the shoreline zone, view from the building site, and access to the shoreline would not appear to be affected.

VI. SUMMARY COMMENTS AND SUGGESTIONS FOR FURTHER RESEARCH

The hedonic model developed from the San Juan County waterfront sales database fulfills two purposes of the study: to identify which attributes of a waterfront property are most relevant in explaining price differences, and to provide a systematic, efficient and relatively objective procedure for estimating overall price/value. Given the high prediction errors and other deficiencies of the two presented regressions, they should be considered more reliable for the former purpose than the latter.

Among the independent variables found to be significant in explaining variations in either or both total price and price per waterfront foot are characteristics related to a property's size and waterfront length, general island location, bank type, extent of critical areas, and year of sale. The significance of these variable is not particularly surprising, though for some, the degree of influence, as measured by the regression coefficients, is instructive, as is the absence of several target variables. Given the underlying purpose of the study to explore methods for valuing shoreline conservation easements which are intended to restrict certain shoreline activities and modifications, it was hoped the models would provide some insight into the contributory value of certain shoreline modification features or structures. However, with the exception of the presence of a shared or private dock, none of the shoreline modification features identified (shoreline armoring, boat ramps, buoys, etc) were found to be statistically significant as explanatory variables or useful in improving the model results. These features simply do not appear to have a material influence – either positive or negative – on the price paid for a waterfront property.

Additionally, there is some inherent imprecision in the measurement of certain variables (characterization of bank type), the generalization of others (location)[12] and the omission of other unconsidered or unmeasurable variables which may have an influence on pricing. In other words, there are more factors that impact the sale price than are accounted for – or are most effectively measured – in the dataset. Despite these deficiencies, the two regression models explain roughly 71% of the variation in price per waterfront foot and total price.

The veracity of the multiple regression models for estimating value is diminished by high residual errors, which, on average, predict values 27% and 30% above the actual price paid. When compared to the assessed value as of the year of sale, the assessed values are found to be near-equally prone to error, with a greater tendency toward under-estimation, especially during the earlier years of the time period examined.

Application of the models to predict current values or values for any other time period beyond the observations in the dataset (through 2013), necessitates an adjustment relative to the base year. This imposes an additional research and analytical component, as well as another element of potential estimation error to the shoreline easement valuation framework. As of this report writing, the base year is nearly five years prior to the current year; the credibility of the adjustment factor decreases as the corresponding magnitude of its impact on the results increases with the expansion of this gap. To a certain degree, this issue may be corrected with further model refinements and regular updates of the database to incorporate the most recent sales; however, improvement depends on an adequate number of sales in subsequent years to yield reliable and meaningful regression coefficients. In any case, the results do not forecast beyond the most recent year represented in the data set. This

[12] Property location was also categorized by island quadrant, census tract, and census block group, but none of these finer measurements were found to be statistically significant.

may be problematic to accurately estimating property values during periods of volatile market activity.

The proportion of the total value of a marine frontage property attributable to ownership of the shoreline – over and above a view building site – is examined by comparing the sale prices of a series of matched waterfront and water view properties. Generalizing from the measures of central tendency for nineteen matched pairs, the proportion of overall value attributable to shoreline ownership is in the vicinity of 40% for high bank, 55% for medium bank, and 60% for low bank properties.

An alternative to employing the proportionate value of shoreline ownership as the basis from which to assess the easement diminution is the proportion of the property's land area within the shoreline area to be protected. While this is appealing for its simplicity in application, many small acreage parcels are predominantly or entirely within the shoreline zone, resulting in diminution factors applied to the property's total value. The fallacy of this result is accentuated for a low bank parcel with an established building site within the shoreline zone and having an unobstructed marine view, as none of these benefits of ownership are negatively impacted by the conservation easement restrictions.

The third major parameter in the valuation framework is the diminution factor attributable to the conservation easement, which is expressed as a percentage discount applied to that portion of the property affected by the easement restrictions. Appraisals of conservation easements on marine front properties on file with the San Juan Preservation Trust offer some authoritative guidance for establishing a range in diminution factors. However, none of the conservation easements addressed in the appraisals reviewed for this purpose are sufficiently comparable to the "typical case" shoreline conservation easement to draw definitive conclusions. Assessment of a diminution factor within (or beyond) the range indicated by the appraisal case studies is necessarily site specific, and depends on how the easement restrictions impact the use and enjoyment of a particular property's shoreline.

In summary, the exploratory framework developed and presented here provides useful insight to the attributes that drive waterfront property values in San Juan County, the allocation of value to shoreline access and other benefits of waterfront property ownership, and the impact on value of conservation easement restrictions. However, at this stage of development, it falls short of being consistently reliable as a tool for estimating the value of shoreline conservation easements on property-specific or neighborhood scale. The potential for estimation error in any one of the three parameters (regression model, proportionate value to shoreline zone, easement diminution factor) should not be minimized, and should be given due consideration in any application to actual acquisition cases, even as a preliminary step.

To repeat the caveats stated in the introductory section, the framework is not intended to replace or provide a more accurate estimate of easement value than a traditional market value appraisal of a property performed under the "before and after" construct. Value discrepancies between any formulaic valuation process and an appraisal may be particularly evident for properties with unusual or atypical features, where the shoreline conservation easement restrictions cause indirect burdens on the remainder property, and/or where the standards for the appraisal require consideration of adjoining lands.

Suggestions for Further Research

One or more of the following areas of research and analysis are recommended before implementation of this or other framework for assessing the value impact of shoreline conservation easements is implemented beyond the Pilot Neighborhood Salmon Conservation Easement Program:

1. Update the San Juan County waterfront sale data base to include recent sales and re-run the regression models to test for stability of the coefficients and establish a more current base year.
2. Examine assessed value to sale price ratios over time to gauge improvement with the county's change to an annual appraisal cycle (beginning in 2011). Current or ratio-adjusted assessed values may be a more universally recognized and accepted benchmark for estimating market value than the hedonic model and be substituted for it.
3. Develop a case study for aggregating assessed waterfront property values across a shoreline neighborhood and standardization of shoreline easement values on either a price per waterfront foot or price per protected acre (square foot) basis.
4. Further research to identify state, county, or regional programs which have adopted valuation schemes other than individual property appraisals (e.g., acquisition programs based on formulas or other metrics) for acquisition of partial interests.
5. Expanded research of diminution ratios for conservation easements that do not reduce residential density.

ADDENDA

Multiple Regression Variable List & Definitions

MULTIPLE REGRESSION VARIABLES: SAN JUAN COUNTY WATERFRONT SALES

VARIABLE LABEL	TYPE	DEFINITION	SOURCE
MAP_REF	text	unique number assigned to sale for mapping purpose	assigned
TAXPARCEL	text	tax parcel assigned by County Assessor	Assessor
LOCATION	text	island or geographic end of island where sale property is located; Lopez, San Juan and Orcas are divided into geographic areas;	GIS/map/Assessor
IMPROVED	dummy	vacant at time of sale=0 (map reference 1-499); improved at time of sale =1 (map reference 500-999). Improvements assessed at greater than $250,000 are not included in data file.	Assessor
SALEDATE	Continuous/ dummy	Date of sale. Date was incorporated into the price models as a dummy variable for every year. Subsequent sales of same property occurring within the time frame are assigned a separate map number	RMD/Assessor
SALEPRICE	continuous	Reported sale price	RMD/Assessor
LAND_PRICE	continuous	Total sale price minus assessed value of improvements; land price is equivalent to sale price for vacant parcels.	RMD/Assessor/TV calculation
ACRES	continuous	size of sale parcel(s) in acres. The total acreage of the sale property is used for sales including multiple tax parcels	RMD/Assessor/GIS
WFFT	continuous	length of waterfront, measured in feet	RMD/Assessor/GIS
DUS	continuous	number of existing or potential density units, as determined by zoning and/or tax parcels	TV calculation
LAND$_AC	continuous	Land price (AV of improvements extracted) divided by number of acres	TV calculation
$WFF	continuous	Land price (AV of improvements extracted) divided by waterfront length	TV calculation
$/DU	continuous	Land price (AV of improvements extracted) divided by number of density units	TV calculation
CT_BLK	text	combination of census tract and block group	US Census
SJUAN	dummy	properties located on San Juan Island (all regions) are assigned a "1"; all others "0"	TV assigned
ORCAS	dummy	properties located on Orcas Island (all regions) are assigned a "1"; all others "0"	TV assigned
LOPEZ	dummy	properties located on Lopez Island (all regions) are assigned a "1"; all others "0"	TV assigned
SHAW	dummy	properties located on Shaw Island are assigned a "1"; all others "0"	TV assigned
OTHERNF	dummy	properties located on all non-ferry served islands are assigned a "1"; all others "0"	TV assigned
PISLAND	dummy	sale property which encompasses all of a privately owned island is assigned a "1"	TV assigned
ISLAND_POP	continuous	2010 resident population for island on which sale is located	US Census
LOC_POP	continuous	2010 resident population for geographic location. For smaller islands, this is equivalent to the island population; for 3 largest islands, it is a combination or subset of block groups	US Census/TV
ISLAND_HSG	continuous	Number of housing units on island on which sale is located	US Census
LOC_HSG	continuous	Number of housing units within geographic location. For smaller islands, this is equivalent to the island population; for 3 largest islands, it is a combination or subset of block groups	US Census/TV
FERRY	continuous	Number of weekly ferry landings on island originating from Anacortes. The number represents average of summer and winter schedule	Ferry schedule (2014)
HBANK	dummy	high bank frontage assigned a "1"; all others "0". High bank reflects difficult physical access to shoreline (generally over 50 feet)	RMD/ analysis of contour maps
MBANK	dummy	medium bank frontage assigned a "1"; all others "0". Medium bank reflects pedestrian accessible shoreline with moderate relief (generally 10-50 feet)	RMD/ analysis of contour maps
LBANK	dummy	low bank frontage assigned a "1"; all others "0". Low bank reflects very accessible shoreline with gently sloping to no relief. (generally 0-10 feet)	RMD/ analysis of contour maps

WFRATIO	continuous	Ratio of waterfront length to property size, expressed as number of frontage feet per acre.	TV calculation
TIDELANDS	dummy	properties which include ownership of tidelands assigned a "1"; all others "0"	RMD comments
S/WEXP	dummy	properties oriented with predominant westerly or southerly exposure assigned a "1"	map assessment
N/EEXP	dummy	properties oriented with predominant easterly or northerly exposure assigned a "1"	map assessment
MARVIEW	dummy	apparent marine view from building site. Narrow bays and lagoons where view is of land across the bay were assessed as non-view	RMD/map assessment
SPLITWF	dummy	waterfront portion of property is divided from upland by a public road	map assessment
ROAD_THRU	dummy	private road passes through property to access other parcels (may or may not cross between building site and waterfront)	map assessment
MISC_AMENITY	dummy	some feature providing amenity, but not occurring frequently enough to warrant a separate independent variable	map assessment
MISC_DISAMENITY	dummy	some feature providing dis-amenity, but not occurring frequently enough to warrant a separate independent variable	map assessment
FOREST	dummy	properties with moderate to heavy forest cover assigned a "1"	map assessment
ZONING	text	zoning designation	RMD/ County map layer
R5ZONE	dummy	R5 (5 ac min lot size) zoning assigned a "1"; all others assigned "0"	RMD/ County map layer
R10/20ZONE	dummy	R10 or R20 (10 & 20 ac min lot size) zoning assigned a "1"; all others assigned "0"	RMD/ County map layer
N/CZONE	dummy	Natural or Conservation zoning designations (density determined by legal lots of record; no subdivision) assigned a "1"; all others assigned "0"	RMD/ County map layer
URBANZONE	dummy	High density zoning designations (smaller than 5-ac min lot size) assigned a "1";	RMD/ County map layer
SEWER	dummy	parcels within or immediately adjacent to municipal sewer service areas assigned "1"	County GIS layer
SHOREMOD	text	type of structural modification(s) made to shoreline as identified by field survey (excludes residential buildings)	Shoreline Modification Inventory - GIS layer
DOCK	dummy	parcel has a dock or has shared ownership interest in a dock - assigned "1"	SMI/RMD/recording
DOCKLF	dummy	length of dock - assigned only to parcels on which dock is located	GIS measurement (TV)
ARMOR	dummy	parcel has shoreline armor- assigned "1"	Shoreline Modification Inventory
BOATRAMP	dummy	parcel has boat ramp- assigned "1"	Shoreline Modification Inventory
SLM-OTHER	dummy	parcel has other shoreline modifications- assigned "1"	Shoreline Modification Inventory
BUOY	dummy	parcel has buoy assigned "1"	Shoreline Modification Inventory
WETLAND_AC	continuous	area identified as wetlands by NWI	GIS measurement from county layer
WETLAND_PCT	continuous	percent of property's total land area which is identified as wetlands	TV calculation
GEOHAZI_AC	continuous	area (acres) identified as high Geological Hazard (slopes exceeding 50%)	GIS measurement from county layer
GEOHAZ1_PCT	continuous	percent of property's total land area which is identified as high Geologic Hazard	TV calculation
GEOHAZ2	continuous	area (acres) identified as moderate Geological Hazard (slopes exceeding 20%)	GIS measurement from county layer
GEOHAZ2_PCT	continuous	percent of property's total land area which is identified as moderate Geologic Hazard	TV calculation

MEAN_SLP	continuous	average slope across property	GIS measurement & calculation
SLP_LT20	continuous	area (acres) with slopes less than 20%	GIS measurement & calculation
SLP_LT20_PCT	continuous	percent of property's total land area with slopes less than 20%	GIS measurement & calculation
SLP_GT60	continuous	area (acres) with slopes greater than 60%	GIS measurement & calculation
SLP_GT60_PCT	continuous	percent of property's total land area with slopes greater than 60%	GIS measurement & calculation

OTHER DATA FIELDS - NOT VARIABLES IN MULTIPLE REGRESSION (or used to calculate MR variables)			
AV_IMP_LND		Assessed value of improvements/ assessed value of land	RMD
AV IMPROV		assessed value of improvements separated	TV extraction
AVLAND		assessed value of land separated	TV extraction
AV TOTAL		total assessed value at time of sale (improvements + land)	TV calculation
AVRATIO		ratio of assessed value to sale price (AV/Sale Price)	TV calculation
LAND%AV		assessed value of land as a percent of total assessed value	RMD/Assessor
IMPROV EXTRACT		value of improvements to extract from sale price to yield land price. This is currently calculated at 100% of assessed improvement value, but can be changed	RMD/Assessor
WFTFF		combined descriptor of waterfront length and bank type	RMD
TYPE1		descriptive comments from data source	RMD
REMARKS		descriptive comments from data source relating to mortgage company; some TV comments added in this field	RMD
COMMENT		descriptive comments from data source relating to zoning & Deeds of Trust	RMD
TYPE2		descriptive comments from data source relating to residential improvements	RMD
TYPE3		descriptive comments from data source relating to other improvements and site features	RMD
USECODE		county assigned use code	RMD
SUBDIV		plat name and lot number if in a subdivision	RMD
TOWNSHIP		township, range and section; also provides indication of number of parcels in sale	RMD
LANDUSE		numeric code	RMD
AREA		geographic market area assigned by data source	RMD
TRACT		census tract	RMD
BLKGRP		block group associated with a census tract	RMD
INSTRUME		sale instrument	RMD
AUDITOR		recording number	RMD
SELLER		name and address of seller	RMD
BUYNAME		buyer name	RMD
BUYSTREET		buyer address	RMD
BUYCITY		buyer address	RMD
BUYSTATE		buyer address	RMD
BUYZIP		buyer address	RMD
PROPADD		address of property	RMD
PREVSALE		price and year of previous sale	RMD
EXTFINISH		code for exterior finish of residential or commercial building	RMD
YEARBUILT		year building was constructed	RMD
SQRFEET		square footage of primary improvement	RMD
BEDROOMS		number of bedrooms	RMD
BATHS		number of bathrooms	RMD
OTHER PARCELS		parcel number of additional parcels included in sale property	TV